

Prevalence of Retained Primitive Reflexes in Patients with Anxiety Disorders

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August 2002

**Thesis submitted to the University of Edinburgh in part fulfillment of the degree
of Doctorate of Clinical Psychology**



CONTENTS	PAGE NUMBER
Acknowledgements	i
Declaration	ii
Abstract	iii
 CHAPTER 1: INTRODUCTION	
1.1 General Introduction	2
1.2 Definitions and Explanatory Frameworks	4
1.2.2 Defining Anxiety	4
1.2.3 I.C.D. and D.S.M. Classifications	8
1.2.3 Prevalence	10
1.2.5 Comorbidity	12
 1.3 ECONOMICS OF ANXIETY	
1.3.1 Introduction	16
1.3.2 Financial Costs	17
1.3.4 Personal Costs	19
 1.4 THEORIES OF ANXIETY	
1.4.1 Psychodynamic Theory	22
1.4.2 Learning and Conditioning Theory	24
1.4.3 Cognitive Theory	27
1.4.4 Biological Theory	29
 1.5 THE INSTITUTE FOR NEURO-PHYSIOLOGICAL PSYCHOLOGY	
1.5.1 Background Studies	34
1.5.2 The Aberrant Reflex	38
1.5.3 Effects of Retained and Undeveloped Reflexes	41
1.5.4 Possible reasons for Failed Transformation of Reflexes	42
1.5.6 Summary	43

1.6 TREATMENT OF ANXIETY

1.6. Psychoanalytic and Psychodynamic Treatment	46
1.6.2 Treatment based on Learning and Conditioning Theory	47
1.6.3 Cognitive Treatments of Anxiety	49
1.6.4 Biological Approaches to Anxiety	50
1.6.5 Treatment Outcomes	52
1.6.6 The I.N.P.P. Remedial Programme	56

1.7 AIMS AND HYPOTHESES

1.7.1 Summary	58
1.7.2 Aims	58
1.7.3 Hypotheses	60

CHAPTER 2 : METHODOLOGY

2.1 Design	62
2.2 Participants	62
2.3 Measures	65
2.3.1 The Beck Anxiety Inventory	65
2.3.2 the I.N.P.P. Reflex Tests	66
2.4 Observation of Testing Procedures	77
2.5 Procedures	77
2.6 Independent Raters	81
2.7 Statistical Power	82

CHAPTER THREE: RESULTS

3.1 Exploration of Data	
3.1.2 Demographic Data	84
3.2 Hypothesis-related Data	
Hypothesis 1	84
3.2.1 Exploration of Scores from Individual Tests	87
3.2.2 Hypothesis 2	89
3.3 Measures of Anxiety and Reflex Test Scores	92
3.3.2 Summary of Results	95

CHAPTER 4: DISCUSSION

4.1 Summary: Earlier research and Findings from this Study	97
4.2 Discussion of Research Findings	99
Hypothesis 1	99
Hypothesis 2	106
4.2.3 Related Findings	111
4.3 Further Exploration of Findings	
4.3.1 Research Design and Selection of Participants	112
4.3.2 Measures	113
4.3.3 Procedures	114
4.3.3.1 Setting	114
4.3.3.2 Raters	116
4.4 Case examples	116
4.4.1 Retained Moro Reflex	116
4.4.2 Undeveloped Head-righting reflexes	117
4.5 Implications of Findings	118
4.5.1 Future Research	119
4.5.2 Use of I.N.P.P. Measures	120
4.6 Summary and Conclusions	123

CHAPTER 5: REFERENCES

127

LIST OF TABLES

Page Number

Table 1: Retained and Undeveloped Reflexes and Associated Problems	41
Table 2.1: Referral Sources for Patients	63
Table 2.2: Ages : Patients and Controls	63
Table 3.1: Scores from Individual Reflex Tests: Patients	85
Table 3.2: Scores from Individual Reflex Tests: Controls	85
Table 3.3: Results From Mann Whitney Analysis of Comparison Between Patients' and Control Groups' Reflex Test Scores	87
Table 3.4: Mean Scores from Patient and Control Groups' Individual Reflex Tests and Results from t-test of Comparison	88
Table 3.5: Patients' Ages at Onset of Anxiety by Self- Report	89
Table 3.6: BAI Scores: Patients and Controls	90

LIST OF FIGURES

Figure 1: ANOVA Plot of Comparison of Mean Scores from all Reflex Tests: Patients and Controls	86
Figure 2: Correlation Scatterplot: Age of Onset of Anxiety and Mean Reflex test Scores	91
Figure 3: Correlation Scatterplot: BAI Scores and Age of Onset of Anxiety	92
Figure 4: Correlation Scatterplot: Reflex Tests Scores and BAI Scores: Patients and Controls	93
Figure 5: Correlation Scatterplot: Reflex Test Scores and BAI Scores: Patients	94

APPENDICES

Appendix 1: Information Sheet for Referring Clinicians

Appendix 2: Information Sheet for Patients

Appendix 3: Patient Consent Forms

Appendix 4: Notification Letter to Patients' General Practitioners

Appendix 5: Beck Anxiety Inventory Score Sheet

Appendix 6: Histogram: Age Distribution: Patients and Controls

Appendix 7: Histogram: Distribution of Reflex Test Scores: Patients and Controls

Appendix 8: I.N.P.P. Reflex Tests

LIST OF TABLES

Page Number

Table 1: Retained and Undeveloped Reflexes and Associated Problems	41
Table 2.1: Referral Sources for Patients	63
Table 2.2: Ages: Patients and Controls	63
Table 3.1: Scores from Individual Reflex tests: Patients	85
Table 3.2: Scores from Individual Reflex Tests: Controls	85
Table 3.3: Results from Mann Whitney Analysis of Comparison Between Patients' and Controls' Reflex Test Scores	87
Table 3.4: Mean Scores from Patient and Control Groups Individual Reflex Tests and Results from t-test of Comparison	88
Table 3.5: Patients' Ages at Onset of Anxiety by Self-Report	89
Table 3.6: BAI scores: Patients and Controls	90

LIST OF FIGURES

Figure1: ANOVA plot of Comparison of Mean scores from all Reflex Tests: Patients and Controls	86
Figure2: Correlation Scatterplot: Age of Onset of Anxiety and Mean Reflex scores	91
Figure 3: Correlation Scatterplot: BAI Scores and Age of Onset of Anxiety	92
Figure 4: Correlation Scatterplot: Reflex Test scores and BAI scores: Patients and Controls	93
Figure 5: Correlation Scatterplot: Reflex Test Scores and BAI Scores	94

Acknowledgements

I must firstly thank Dr. Maurice Winton for patiently supervising this work and helping me to keep a focus, and also the staff of the clinical psychology department for their consistent support and interest. Thanks also to Dr Beryl Shepherd, consultant psychiatrist, and Patsy Brodie, Head of Occupational Therapy Services, for reading the thesis drafts, to Kate Harrison, librarian for Tayside NHS trust, and also to the staff of Community Mental Health Team 4, Dundee, for their invaluable input.

The support of the course team at Edinburgh has been much appreciated, especially the help from Dr. Ruth Thomson since the early days of the project, and the statistical advice given by Dr. Arthur Still. Additional help with statistics was provided by Dr. Simon Ogston, lecturer in Medical Statistics, Ninewells Hospital.

I have to thank my family for their sustained (and strained) tolerance, particularly Neil, for rescuing me from the curse of the computer macros. Last, but certainly not least, my gratitude to all the volunteers who acted as participants. Without their help none of this would have been possible.

Declaration

“ I certify that this is a true and accurate account of the work carried out. This thesis has been composed by myself and the work contained herein is my own.”

Signed

DIANE S. FORREST

Abstract

Anxiety is not only one of the mental health disorders most commonly referred to clinicians, but is also a research interest, producing subsequent modification in treatment approaches. However, there are suggestions in the literature that the effectiveness of some psychological treatments have not been systematically evaluated (Department of Health, 2001), or that treatment studies have employed methods unrepresentative of everyday clinical practice (World Health Organization, 2000). Furthermore, from analysis of outcome studies, psychological therapies have been reported as effective for only half of those treated (Fisher & Durham, 1999). These findings suggest that there are individuals with anxiety who fail to respond to available therapies, and that alternative approaches for this group are not well studied.

One biologically-based explanation for variable responses to treatment cites the possibility of anxiety as resulting from failed development of primitive and postural reflexes, necessary for processing sensory information and maintaining gravitational security. This theory is central to the work of the Institute for Neuro-Physiological Psychology (I.N.P.P.), recently applied to research which identified infantile reflexes, and failed transformation to adult responses, in a population of adults with differing sub-types of anxiety (Blythe, 1999).

This study aimed to apply I.N.P.P. reflex tests to the detection of the characteristics of reflexes in a group of adult patients with Generalized Anxiety Disorder, compared to a group of non-anxious adults. A significant difference was found between patient and control group reflex test mean scores, patients achieving higher scores on all of the six

tests employed in the study. From analysis of all individual test scores, two of these, detecting involvement of labyrinthine processes, resulted in the highest scores. The findings from analysis of resulting data are discussed in relation to implications for future study and further use of the measures with differing populations.

CHAPTER ONE: INTRODUCTION

1.1 General Introduction

Anxiety is one of the commonest problems which is dealt with by clinicians, and has become the focus of specialist research and intervention. The costly, pervasive and often distressing nature of this phenomenon is recognized, and has prompted the drive for advances in understanding and treatment. Theories of anxiety have moved from classification as a neurosis, to cognitive levels of analysis, prompting increased interest over recent years, along with therapeutic approaches evaluated as successful. This last factor is encouraging for clinical psychology, as a discipline with a major role in translating research into effective treatment approaches.

However, as a complex phenomenon, varying responses to treatment have been noted in the literature, with either the patient's anxiety failing to resolve, or improvement not sustained over time. Such outcomes, despite application of well-researched and evaluated approaches, have stimulated efforts to extend study into the realms of non-conscious and biological phenomena as possible influences in the genesis and maintenance of anxiety.

If the latter do have a role in this affective problem, this suggests implications for the understanding of anxiety and review and advancement of existing treatments.

In this study, the possibility of a biogenic, or physiological basis for anxiety will be explored. Firstly, aspects of anxiety, including definition, classification, presenting features and effects will be outlined. In the following section, theories seeking to explain anxiety will review existing frameworks, and discuss the development of those which posit a neuro-physiological explanation. From here, treatment approaches based on the explanatory frameworks will be reviewed. This will include an outline of possible interventions drawn from neuro-physiological theory, which, following an establishment of a biogenic basis for anxiety, would be directed at the treatment of the problem.

This introductory section will close with the aims and hypotheses of this study: these involve the use of neuro-physiological assessments with patients diagnosed as suffering from anxiety, in testing for hypothesized presence of factors suggesting neurological and biological influences.

The following account of the method, design and procedures will precede the presentation of main findings, leading to discussion of these, with possible explanations for the outcomes, and suggested implications.

1.2 DEFINITIONS AND EXPLANATORY FRAMEWORKS

1.2.1 Introduction

Definitions and explanations of anxiety have been influenced by developments in understanding and changing interpretations over time. The dilemma of defining anxiety is reflected in difficulties with this task (Murdoch and Barker, 1991), as evidenced by the fact that in 1961, Cattell and Scheier reported as many as 160 measures claiming to define anxiety. As Rachman (1998) states, however, classifying anxiety disorders imposes order in the face of such complex phenomenon: for example, diagnostic manuals, such as the Diagnostic and Statistical Manual of Mental Disorders-IV (American Psychiatric Association, 1994) and the International Classification of Diseases-10 (World Health Organization, 1995) define seven types of anxiety. The complexity involved in arriving at definitions, and how these have been elaborated will be discussed below.

The prevalence and presentation of anxiety will be included in this section, as will an overview of theories of anxiety and interventions based on these

1.2.2 Defining anxiety

Increase in study of anxiety, prompted by raised interest, has aimed to improve understanding, but has also complicated attempts to produce a unifying definition or theory (Lipschitz, 1988). Attempts to define anxiety from the beginning of the twentieth century

onward, have explained this as unconscious forces (Freud, 1949), learned behaviours (Kazdin, 1978), dysfunctional cognitive processes (Stopa & Clark, 1993) or the result of biological aberrations (Goddard Blythe, 1989).

At one time or another, or in differing philosophies, unconscious, behavioural, cognitive or biological explanations have been offered as defining theories of anxiety, and manifestations of the disorder. More recently, types of anxiety have been classified by diagnostic criteria, as in the Diagnostic and Statistical Manual of Mental Disorder–IV (American Psychiatric Association, 1994), which will be discussed later. Categorizations of different and “newer” subtypes, such as generalized anxiety disorder (G.A.D.), suggests that the existence of a variety of forms of anxiety may not be usefully defined by grouping the types together under a particular rubric.

In attempting to offer a definition, responses and experiences commonly reported as accompanying anxiety have been considered. These include the negative anticipation of events, and associated fear which may not have an identifiable cause. The apparent lack of a precipitant for the anxiety puzzles the sufferer, and thereby exacerbates the anxiety (Rachman, 1998). Also, anxiety does not only influence changes in thinking or emotional processes, but also in physiological activity and behaviour. In one integrated model, Lang (1985) includes physical, mental and behavioural systems, which also relate to the landmark theories, to be discussed below. (Powell & Enright, 1990). The components identified in the three-system framework do not always co-occur (Lang, Levin, Miller & Kozak, 1983), and

have been stated as varying in the different subtypes: for example, panic disorder is defined by physiological changes, “abnormal distress” and derealization, while worry is the central feature of G.A.D.

Nonetheless, symptoms can be shared among the different forms: avoidance can also result from panic, and presents strongly in phobia, but phobia can develop from panic (Last & Hershen, 1988). Moreover, worry may also cause avoidance of a feared event due to the anxious nature of cognitive and emotional processing (Salkovskis, 1996). This may progress to persistent avoidance, resultant unfamiliarity with the event or object, and subsequent phobic responses to impending contact. One agreement is that particular changes in bodily feelings are associated with anxiety, including rapid heart beat, muscular tension and, in some cases, tremor (Tyrer, 1976). Heightened arousal is also produced by excitatory biological processes, as this is regulated by the part of the central nervous system responsible for involuntary responses, as a reaction to threat. However, it has been suggested that high arousal levels in fear are not so marked in anxiety (Rapee, 1996).

Although many features of anxiety can be observed and measured, the overlap between symptoms and the varying types of anxiety in which they present, and the need to clarify the underpinning processes and modalities, add to the range of material, but also to the confusion about defining or conceptualizing this condition (Power & Dalgleish, 1997). Difficulties encountered in defining anxiety have prompted suggestions that the term should be surrendered. It is argued that “lay” appreciation of the word, and its use in everyday language

renders “anxiety” unhelpful as a definition (Hallam, 1985). In everyday parlance, for example, being “anxious” can signify apprehension, but also keenness, as in being anxious to go somewhere, or to do something.

Also, just as “being depressed” may currently be used to describe temporary disaffection, being told “not to be too anxious” may signify that matters do not require great effort or speed of response. Wideger (1992) has also postulated that categorization of problems as “anxiety” or “personality” should be abandoned, as it is more helpful to understand a problem by identifying the degree to which it interferes with the person’s functioning.

There are echoes of this viewpoint in a dimensional model which also emphasizes the importance of individual differences (Yapko, 1994). The explanations outlined above have physiology, behaviour or cognition as central dimensions on which anxiety exists. Yapko (1994) extends these, by stressing the “imbalance in subjective experience” on eight different dimensions, which are substrata for psychological problems. The dimensions are physiological, cognitive, behavioural, affective, relational, symbolic, contextual and historical, and the nature of interpersonal, intrapersonal and situational experiences can be identified on the continua of these dimensions. This model therefore includes the three systems, but also stresses the variation in influences from development, interplay between internal and external factors and subjective experience, as contributing to the person’s coping abilities. A framework such as this also illustrates the difficulty of capturing the determining features of a problem such as anxiety.

Nevertheless, the effects suffered by those who have an anxiety disorder emphasize the problematic nature of the condition, and explains the attempts made over time to develop commonly acknowledged descriptions and references.

1.2.3 ICD and DSM Classifications

The International Statistical Classification of Diseases-10 (ICD-10), and the Diagnostic and Statistical Manual of Mental Disorders -IV (DSM-IV) are systems which aim to classify mental health problems by defining signs and symptoms specific to each disorder. The World Health Organization co-ordinates the revisions of the ICD manual, wherein each is given a numerical code preceding its entry and relevant diagnostic indicators (Sartorius, 1995). The DSM is published by the American Psychiatric Association, and similarly employs a coding system: in the ICD-10, anxiety disorders are listed as categories F40-48, “Neurotic, stress related and somatiform disorders”, with subtypes, including general anxiety disorder. The latter is coded 300.2 in the DSM-IV.

The anxiety disorders classified in the D.S.M.-IV are as follows:

- Panic disorder with out agoraphobia
- Panic disorder with agoraphobia
- Agoraphobia without history of panic disorder
- Specific phobia
- Social phobia
- Obsessive-compulsive disorder

- Post traumatic stress disorder
- Acute stress disorder
- Generalized anxiety disorder
- Anxiety disorder not otherwise specified

The category specifying anxiety due to particular causes includes substance-induced anxiety. Both manuals have associated guidance on diagnosing mental disorders, by providing descriptive lists of symptoms, and severity criteria from mild to severe: the ICD-10 also offers models of the progression of disorders, and diagnostic and management cards, to assist in interview and treatment.

Both of the above are diagnostic instruments, however, and this may present some of the difficulties with such guidelines. These systems are specific and nominal, and may place the patient in a pathological category, by assigning a diagnosis which, if recorded in clinical casenotes, can remain there for life. In addition, individual differences can mean that the criteria in the coded disorders do not fit the person's presentation, and a dimensional approach would be more appropriate. Another difficulty could lie in attempts to assess patients with more than one disorder: for example, depression may co-exist with obsessive-compulsive disorder, resulting in a range of symptoms which are difficult to match to those in the criteria. The ever-increasing range of disorders specified with each revision, and the over-inclusiveness of these has also been criticized (Brown, Schulberg, Madonia & Houck, 1996; Follett and Houts, 1996).

As Rachman (1998) notes, the DSM-IV and ICD-10 both create some order in an area of such diversity and importance. However, the focus on diagnosis does not necessarily aid identification or description of the main problems caused for patients because of their disorder. In addition, attempting to encompass as wide a range of disorders as possible, and specifically categorizing these has provoked criticisms as outlined above. Neither is there a progression from classification of disorders to treatment frameworks, although the ICD does address this for some conditions.

In summary, both the ICD and DSM classification systems result from the need to distinguish signs and symptoms of an ever-increasingly recognized array of disorders. They are primarily designed both to assist with agreement among clinicians regarding the identification and naming of disorders, and to assist in these processes, in keeping with a medical model.

1.2.4 Prevalence

The prevalence of sub-types of anxiety disorders occurring in the general population has been estimated as follows:

- Generalized Anxiety Disorder (G.A.D.): 5 per cent, but 12 per cent in patients receiving treatment for an anxiety disorder (Barlow, 1988).
- Obsessive Compulsive Disorder: between 2-3 per cent, but “ probably more

common” in the general population than thought (De Silva and Rachman, 1997)

- Panic Disorder: 2.1 per cent prevalence for women, 1 per cent for men.
- Social Anxiety : ranging from 1 per cent to 22 per cent (Barlow 1988; Edelman,1992)

The above are varying estimates of forms of anxiety, but with figures ranging from 3 to 12 per cent for generalized anxiety disorder, this represents a considerable area of clinical concern. Anxiety is one of the major mental health problems dealt with in primary care settings. Analysis of the top ten consultation rates by condition per 1000, reveal that anxiety is the fifth most prevalent presentation for all problems (Scottish Health Executive, 2001). Review of the data from this report for in-patient treatment of mental health problems reveals that “neurotic disorders” form 11.8 per cent of this population. Anxiety is classified as among this group of disorders, therefore this presents not only in primary care settings but also in the population receiving institutional care.

Reflecting the implications of these data, the Continuous Morbidity Recording (CMR) project, collating data from 6 per cent of all Scottish general practices, describes the use of anxiolytics in response to demands of treating anxiety, as an “area of therapeutic interest”: during the period from 1993-1998, between 15 to 16 million daily doses of hypnotics and anxiolytics were dispensed, suggesting the frequency of presentation of

patients with anxiety disorders seen as requiring treatment. The CMR also notes that medical opinion has moved to the consensus that use of medication should be reduced, and that other treatment methods should be chosen (Chief Medical Officer, 2001).

1.2.5 Comorbidity

One of the problems outlined above in applying diagnostic manuals is that of identifying a disorder where two conditions appear to coexist. Anxiety itself can feature in depression, in the sequelae of substance abuse or following trauma. Correspondingly, the DSM-IV contains categories which classify sub-types, including “Anxiety Disorder Not Otherwise Specified”.

More specifically, the frequency of co-occurrence of anxiety and depression has been reported in the literature: in socially anxious individuals, depression has been found as coexisting, (Rapee, 1996), while 19 per cent of patients with G.A.D. were also diagnosed with depression (Barlow, 1988). In older adults, findings that anxiety was less likely to occur with depression were challenged by a study assessing depressed adults aged 60 and over: 35 per cent of these had a “lifetime” diagnosis of anxiety disorder, 23 per cent of these with current anxiety problems. In addition, where generalized anxiety disorders were a comorbid factor, levels of depression were more severe (Lenze, Mulsant, Shear, Schulberg, Dew et al. 2000; Blazer, Hales, Talbot & Yudovsky1997).

Comorbidity of sub-types of anxiety has also been detected in previous studies: in 1995, from psychiatric status ratings of patients attending the Harvard Anxiety Management Program, Yonkers, Warshaw, Massion and Keller (1995) found psychiatric comorbidity to be high for generalized anxiety disorder, panic and social phobia. From one to two year follow up, these authors also found remission rates to be low, and in tandem with these findings, underlined the chronicity of generalized anxiety disorder.

Perhaps, then, due to the enduring nature of their difficulties, for some individuals the abuse of substances such as alcohol and non-prescribed medication have also been associated with anxiety disorders, as an attempt to cope. However, such substance abuse can be a source of the problem. In cases of social phobia, for example, the overwhelming prospect of social participation may lead to the use of alcohol or medication, either to lessen the anticipatory anxiety or to boost confidence. However, one outcome from the adoption of these behaviours as coping strategies is dependence, with accompanying depression or anxiety states featuring strongly in this pernicious cycle (Regier, Rae, and Narrow, 1998; Kushner, Sher and Beitman, 1990).

Unfortunately this approach to dealing with anxiety is not restricted to adult groups: there is evidence that younger populations may resort to "self medication" in attempts to confront or lessen effects of mental health difficulties (Satcher, 1999). Satcher also found that in adolescents diagnosed as suffering from anxiety disorders, not only did

depression accompany these, alcohol abuse and behavioural problems were also found to be present, and among the most frequently occurring psychopathology.

Finally, anxiety can be caused by fears about physical illness: for example, experience of chest or gastrointestinal pain may precipitate worries about possibilities of myocardial infarction or cancer, as in Bravo and Silverman (2001), who describe the phenomenon of “hypochondriacal concerns”, that influence referral rates to accident and emergency units. Individuals who have such excessive concerns regarding physical symptoms are driven by their anxieties to become frequent users of general medical and emergency services, rather than mental health services (Blazer, Hales, Yudovsky & Talbot, 1997). It has also been noted here, however, that these groups of service users, who consult because of worries about illnesses they fear they have, present with psychiatric symptoms in the form of health anxiety.

In contrast to the population of those who suspect illness, and develop worries and anxiety due to their preoccupations, there is also evidence that anxiety can occur with actual physical disorders (Burvill, Johnson, Jamrozik, Anderson, Stuart-Wynne & Chakera, 1995). This study, following up patients a year after they had suffered a cerebrovascular accident (C.V.A.), found presence of anxiety disorders, largely agoraphobia, but also generalized anxiety disorder. From this study, Burvill et al. also suggest that prevalence of anxiety, and depression, post-C.V.A is underestimated .

Presence of anxiety has also been established in another neurological condition: Berrios, Campbell & Politynaska (1995) hypothesized that patients with diagnosed Parkinson's disease would have autonomic complaints, and diminished autonomic reflexes, and that these would be related to anxiety and depression. The autonomic nervous system is outside voluntary control, and acts automatically on organs and systems including the gastrointestinal tract, the bladder and the pupil of the eye. This part of the central nervous system also regulates the "fight or flight" mechanism, therefore the poverty of movement resulting from Parkinsonism may be a source of anxiety in the face of perceived threat, without the physical ability to respond. The significant association between autonomic symptoms and anxiety resulting from the tests used, supported the claims Berrios et al. (1995) hypothesized for the relationship here between psychological and physiological problems.

Finally, measures of "neurotic" symptoms in patients with schizophrenia are used in completion of a "relapse signature". This is aimed at helping the patient to recognise prodromal, or warning signs of psychotic relapse (Birchwood, Spencer & McGovern, 2000). Increased anxiety is an indicator of relapse, as a result of vulnerability to environmental stress (Zubin & Spring, 1977), and a search for meaning and control of their experiences. Also, increased self-monitoring for faults, a central component of social anxiety, is likely to hasten relapse if not detected and treated, for example, with stress- management strategies.

From review of the literature, therefore, although anxiety disorders themselves are of significant clinical concern, the establishment of their coexistence with a range of other mental and physical health problems could heighten these concerns.

1.3 ECONOMICS OF ANXIETY

1.3.1 Introduction

Anxiety disorders have an impact on sufferers, services and also on clinicians as they strive to identify the nature and effects of these, and which treatments are most effective. The latter is an important aspect, as treatment is aimed at improving coping style, well-being and quality of life for the person in receipt of intervention. This is as relevant for anxiety disorder as for other mental health problems.

Cost implications of anxiety are among the concerns leading to strategies for estimating prevalence, assessing and dealing with this. Anxiety has been estimated as the most prevalent of major disorders, occurring up to eleven times more frequently than schizophrenia (Regier, Rae & Narrow, 1998), and, in Scotland, as presenting in more than a quarter of medical patients (Chief Medical Officer, 2001). Obvious economic costs arise from contact with health services, including in-patient care and prescription of medication: however, there are costs of another nature, in the form of effects on those whose functioning is limited by anxiety. These human costs can have wide-ranging

personal implications, with negative influences not only on daily life, including loss of work days but also on realizations of future plans or aspirations.

In considering the different types of costs, some of the issues outlined above will be summarized in the following.

1.3.2 Financial costs

There are many aspects involved in the measurement of economic considerations. There are financial demands incurred not only by direct contact with services, or treatment, but also due to factors such as the following: loss of productivity; comorbid problems; cost of welfare benefits to those unfit for work, and potential lack of income for those who become carers.

Estimation of the financial impact of these issues has been calculated based on hours of labour lost, direct costs and cost-benefit analyses of treatment, and costs due to prevalence and to the length of treatment required. Findings from such analyses were that anxiety was the costliest of mental health disorders, reaching almost \$47 million in expenditure across the different health, market and social measures employed (Rice & Miller, 1998) This was in comparison to the \$32 million budget requirements for management of schizophrenia, commonly regarded as a serious mental illness, treated with expensive antipsychotic medication.

Although schizophrenia accounted for the highest expenditure for direct costs, indirect

costs of anxiety were three times higher than those for psychosis, at \$35 million (Rice & Miller, 1995) These indirect costs included loss of productivity and subsequent reduction of goods in the marketplace, reduced earnings, welfare costs and those imposed on voluntary agencies and families.

Costs of direct contact are suggested by frequency of consultations due to anxiety: these have been reported by the Scottish Executive as representing 10 per cent of general practitioners' contacts, compared with 14 percent for depression, the most frequent cause of consultation. Given that a wide range of problems is dealt with in primary care, anxiety features highly in this, against the most frequent of all contacts, which was for influenza, at 18 per cent. (Chief Medical Officer, 2001) As it is possible that assessment of anxiety will be lengthier than that of the physical signs and symptoms of 'flu, there are cost implications of general practitioners' time. In addition, the volume of anxiolytic prescription over the five- year period of data collection averaged 16 million "defined daily doses" per year (British Medical Association and the Royal Pharmaceutical Society of Great Britain, 2001). If the anxiolytic Diazepam alone is considered, at a current cost of almost two pence per 2mg tablet (the minimum dose), this amounts to £320,000 from the annual budget allocated to the health service.

One of the issues also raised in this report is the overshadowing of psychological concerns resulting from the development of biological findings. These have detected biological factors amenable to drug treatment, but this has also led to an over-

prescription of medication. It is reported that medical practitioners' views are that prescribing behaviours in terms of anxiolytics and hypnotics are seen as demanding attention, and require a move to the use of non-drug treatments. As researchers and clinicians, this has implications for clinical psychologists.

1.3.3. Personal costs

Not only financial costs, but personal ones are considered in the above-mentioned literature. Rice and Miller (1998) discuss the deterrent effect on sufferers, preventing them from working, and also on families, who may have to surrender jobs to adopt the role of carer. One illustration of effects of anxiety on work prospects has been quoted by Rachman (1998) with estimates that males with anxiety disorders were four times more likely to be unemployed. Further to this, lower quality of life and low productivity were associated with social anxiety disorder. When this condition co-existed with other pathology, then effects were even wider: expectancies for attaining graduate status were 10 per cent lower than those of a non-clinical population, as were prospective earnings. Hopes of a professional job were 14 per cent less. However, there were findings of greater concern, representing the greatest cost of all: perhaps driven by reduced life quality and expectations, 22 per cent of the out-patient group in this study had attempted suicide (Katzelnick, Kobak, DeLeire, Henk, Davidson et al., 2001).

Quality of life indices employed in studies have also revealed an "almost uniform picture" of anxiety disorders as severely impacting on sufferers' experiences of their life

(Mendlowicz and Stein, 2000). For one patient population, reduced quality of life measures correlated with anxiety: in cases of schizophrenia, anxiety featured both in positive and negative symptoms, and was the most significant factor in depressed quality of life scores. These authors also suggest that anxiety in psychosis should be seen as a separate dimension, as this disorder is normally only considered in non- psychotic populations (Huppert & Smith, 2001).

Rachman(1998), Katelnick et al. (2001), Mendlowicz & Stein (2000) are therefore among those who have noted that aspirations for educational, employment and general lifestyle are greatly and negatively affected by presence of an anxiety disorder. This phenomenon may begin earlier in life. Carr (1999) outlines how the actual problem of general anxiety disorder in a child has the potential to constrict life at this stage: in the example of Generalized Anxiety Disorder given above, avoidance behaviours, due to the fear of ridicule by peers, or admonitions of teachers, could have resulted in the child becoming housebound. The outcomes of this disruption of developmental tasks may not only be prevention of socialization, but also of educational attainment. Disadvantages of this are reflected in findings of diminished expectations for career prospects and income among adults with anxiety disorders. These financial factors are future concerns, but the lack of social contact in childhood imposed by avoidant behaviours can mean isolation, with no access to opportunities to learn social rules, how to make friendships or develop social constructs which prepare for coping as an adult. As a recognized coexistent with

anxiety, there is also the possibility of depression of mood, due to the unhappy state of a child suffering from social isolation.

The alternative costs of anxiety in childhood can be seen as echoed among older adults. Although frequency of attendance at emergency services has been identified among this population, the implications are not only for costs of direct contact. In their paper on affective disorders in older patients, Bravo and Silverman (2001) suggested that older adults with ‘hypochondriacal concerns’ can become isolated and increase genuine aches and pains as a result of their self-focusing. Bravo & Silverman (2001) also note that this group actually has difficulty in accessing services. It could also be that the energies of this group are directed at health related self-concerns to the extent that others find it difficult to engage with them in social contact, and that, clinically, they become seen as treatment-resistant patients.

Results from epidemiological and psychological research (World Health Organization, 2000), and from government reports (Scottish Health Executive, 2001; Department of Health, 2001), heighten concerns as to how best to respond. In seeking to offer possible explanations of anxiety, psychological theorists, from Freud to those currently studying cognitive and neurological theories (Beck & Emery, 1985; Beck & Rush, 1985; Herbert, 1997; Gray, 1988) have painstakingly studied this disorder, setting out all the constituents of evolving frameworks. These efforts have not remained at the experimental level, however: in response to progress in understanding anxiety and its

effects, research has been translated into methods for direct application to this major, and often debilitating problem.

1.4 THEORIES OF ANXIETY

As discussed above, definitions of anxiety have been refined with developments in our understanding of anxiety, so theoretical concepts have also evolved. Major theories are summarized below.

1.4.1 Psychodynamic theory

From an early, psychodynamic perspective, Freud (1917) consigned anxiety to the group of disorders termed neuroses. These were regarded as mental disorders, with no origin in the nervous system, but in dynamic, intra-psychic conflict (Freud, 1949). These occurred on an unconscious level, largely, in Freud's original theory, as a result of blocked psychic energy, and attempts to repress experiences caused by "sexual restriction" (Stevens, 1983). Anxiety would arise from such a challenge to the ego, in attempts to regain balance, but also as a protective, defence mechanism. In hypothesizing about anxiety, Freud's model evolved into earlier and later theories, also identifying a "free-floating" form of anxiety, of a generalized type, and a more specific form, of fear of objects or events, anticipating the classification of specific phobia.

Although his theories and approach to treatment were criticized as unscientific, and unreproducible, Freud was working within a scientist-practitioner model of his time, with

rigorous and detailed accounts of his studies, which also included a model of development (Thomas, 1990). Furthermore, psychodynamic theory did not remain static. Neo-freudians, such as Klein (1948), Fromm (1947) and Horney (1937) stressed social and cultural contexts of problems, shifting from sexual impulses as a source of conflict. For example, Klein's theory of anxiety (1975), drawn from writings from 1949 to 1963, was based on a theory of development. She described two types of anxiety, persecutory and depressive, as products of the child's interactions with their world, particularly between parent and child. Klein also stated that anxiety at this life stage persists into adulthood, in agreement with later findings (Iolango, Edelson, Werthamer, Lanson, Crockett & Kelman, 1995). This model of anxiety also described "taking others into the self" as part of the development of personality and ways of dealing with the world, and persecutory anxiety as maintained by fear of criticism. These statements are in keeping with concepts of social learning theory, and triggering and maintaining factors in social anxiety or social phobia.

Psychodynamic and psychoanalytical theory was elaborated to include social context, and another researcher in this philosophy, Sullivan (1938; 2000) accorded a significant role to anxiety, and described how interpersonal factors influenced personality development. In this explanation, the child evaluates experiences in terms of levels of anxiety provoked, and interprets future interactions on the basis of the nature of the earlier experience. From this emphasis on interpersonal factors, Sullivan became an influential figure in the evolution of interpersonal approaches (Klerman, Weissman, Rounsaville & Chevron, 1984), and in the modification of psychoanalytic treatment for psychoses. Also, in Sullivan's view, the

importance of personality lay less in classification by typology, and more in the influence of this on construal of interpersonal relations. However, measurement of personality is central to a theory with a competing explanation of anxiety, developing from reactions to the criticisms of psychodynamic philosophy, as discussed below.

1.4.2 Learning and conditioning theory

Although Sullivan elaborated the theory of psychodynamics, the emphasis on sexual experiences as a source for anxiety, and the inaccessible nature of underpinning processes as a rationale for this in the original psychoanalytic perspective, led to the repercussion of behaviourism (Toates & Slack, 1990). This certainly had no place for unconscious activity, or unobservable phenomena, and, in this philosophy, anxiety is a learned, observable behaviour (Watson & Rayner, 1920). An original behavioural explanation is found in the works of Pavlov, from experiments on conditioning, demonstrating how a stimulus could evoke a response, even when a stimulus paired to, but different from the original was introduced. This evolved into a theories of anxiety based on learning by conditioning (e.g. Mowrer, 1939). For example, anxiety, such as social anxiety, will be a response when an individual has been socially embarrassed or disgraced, and social contact becomes associated with feared, unpleasant experiences.

However, the processes involved in acquisition of fear and anxiety are not so easily identifiable. Longitudinal study of children's experiences from separation from parents and

the development of anxiety showed that this did not happen across all groups, ages or circumstances: separation at 3 years did not proceed to anxiety, and separation due to

hospitalization was not related to anxiety at 18 years (Poulton, Milne, Craske & Menzies, 2001). Where anxiety did develop, the strongest factor was modelling, not separation, suggesting that characteristics of development of anxiety are multifactorial.

Reflecting this complexity, in further current behavioural research on anxiety, parent and child interactions, a focus of Kleinian theory, is also seen as an important influence on development. Parental modelling of anxiety-related behaviours, reinforcement of negative perceptions and the transactional patterns in transmission of anxiety were all linked with children's anxiety (Hudson & Rapee, 2001). In addition, social aspects are integrated into modern learning theory of anxiety in the theory of reasoned action: avoidance due to anxiety stems not only from the person's fears, but also agreement on the nature of these from groups and individuals important to them (Ajzen & Fishbein, 1986).

Social and developmental dimensions did not feature in another elaboration of behavioural and learning theories which also had conditioning as a central tenet. In Eysenck's typology of personality (1957; 1967) conditioning is a major influence on development of anxiety, along with autonomic nervous system structures, which control arousal levels. Introverts, whose personality is measured on a continuum, and whose arousal levels are constitutionally high, are open to conditioning, and therefore respond readily to anxiety provoking cues.

Although there is a biological component here, conditioning continues to play a major role.

The use of a dimensional measure of personality, with neuroticism on one axis and criminality on another, identifying a predetermined personality type, does not offer much hope for change: however, this is remedied in a development from dimensional theory, introducing the concept of constructs. These are based on interpretations of, and attitudes to the person's world and those in it. Within a humanist perspective, construct theory sees Man as a scientist, and behaviour as an experiment: the meaning that is attributed to events affects person's psychology. For example, someone who hoards papers with important facts will be most unhappy if they're thrown out as rubbish (Kelly, 1955, 1970).

Outlining this philosophy, Kelly stated acceptance of a classification as behavioural, existential or cognitive (1970). Constructs, which are identified in corollaries, or axes, serve by providing location points to measure an attitude or belief about people or events. Anxiety would be indicated on a negative axis of the Range corollary, measuring anticipation of events, although Kelly (1955) also qualifies the theory by pointing out individual differences and the difficulty in placing these directly in a mathematical space. Nonetheless, constructions of the world are open to revision, due to their "permeability", and can be changed for the better without "making the psychological house fall down".

Personal growth is an important developmental dimension in Kelly's philosophy (1955), especially in the light of preceding disciplinary, behaviourist views of this, and the

psychodynamic model of instinctive, infantile drives (Bannister, 1970). Ramsay (1998) also notes that Kelly's constructivist approach was accredited as an influence on the earliest writings concerned with the model to be discussed next, also concerned with a form of personal growth, but, in this case, related to adoption of adaptive coping strategies. This influence lies in the method of deriving meaning from constructs which elucidate the person's beliefs and expectations about the world, a core theme in the cognitive approach.

1.4.3 Cognitive theory

Kelly saw construct theory as cutting free from Stimulus-Response determinism (Bannister, 1970). He also saw expectations from appraisal as germane to the person's responses and ability to cope with perceived challenges. Appraisals, of a negative and unhelpful nature, are central to the cognitive model of anxiety. Drawing from cognitive science, information processing and memory structures, or schemata Beck (1976; 1987; Beck & Emery, 1985; Beck & Rush, 1985) translated these into a theory of affective disorders, and the corresponding treatment frameworks. Faulty perceptions, due to negative experiences or poor self-regard, are mapped in memory, and become over-riding beliefs and assumptions. These lead to fearful thoughts, and over-prediction of disastrous outcomes (Clark, 1989). Certainly, development is considered in the cognitive paradigm, as schema can become flawed by childhood experiences, and faulty assumptions and automatic thoughts can develop from a pernicious cycle of anxiety-biased information processing (Beck, 1976; Eubank, Collins & Smith, 2002) This is also accompanied by physical, emotional and behavioural responses.

In the paper by Hudson and Rapee (2001), the probability of children's appraisals of situations as threatening were likely to be high where a "similar adaptive pattern" was found in parents. The mode of establishment and continuance of negative perceptions and predictions is explained in the above. The physical changes and effects on reasoning experienced during anxiety will further increase this state, and prevent a return to physiological or psychological order. Studies have found anxious people to display particular attentional characteristics: concentration on threatening cues, inability to be distracted from these, and narrowing of focus were all found in anxious participants responses to different cues (Macleod, Mathews & Tata, 1986). In a later study, anxious participants not only showed bias to threatening messages, but could also be distracted from neutral cues by these (Mathews, May, Mogg & Eysenck, 1990). This selectivity in attending to threat, and inability to adopt a broad, visual focus exacerbates the anxiety state.

Furthermore, in cognitive studies, metacognitions, or "feeling of knowing" the correct solution, assisted reasoning in memory or trivia problems, but not with insight, or realistic perceptions (Metcalf & Weibe, 1987). In anxiety, attention is not only narrowed and directed towards threat, but, as discussed above, is inward –focused. The inability to apply reasoning to perceptions of the self as incompetent, and others as knowing this demonstrates the flawed reasoning which maintains the anxiety from these dysfunctional perceptions (Wells & Clark, 1995). On the other hand, one study elaborating on cognitive approaches for affective disorders (Segal, Williams & Teasdale, 2002) found that patients who still had

negative beliefs, measured on the Dysfunctional Attitude Scale, did not relapse, but adults with normal scores were likely to relapse. This, and the co-existence of anxiety and panic disorder with depression, prompted a shift seen by Segal et al. (2002) as a “radical departure” from original cognitive-behavioural training: they introduced mindfulness into treatment for anxiety, to encourage stillness and experience thoughts as just thoughts, and let them pass, rather than heightening anxiety by focusing on these as negative.

1.4.4 Biological theory

In a paper preceding Segal et al. (2002), a meditative approach was seen as addressing not only cognitive, but physical components of anxiety, and reducing this by actively recognizing the importance of physical processes (Zabat-Zinn, Massion, Kristeller, Petersen, Fletcher et al., 1992). With a focus on physiology of anxiety, neurological systems are the central concern of biological explanations. Gray (1988) describes a behavioural inhibitory subsystem of the brain, which contains a spatial map, constructing and comparing expected and actual locations. This system, the hippocampus, is therefore judged to act on the predictive nature of constructions of events or behaviours. The fight–flight system, sited in the mid-brain, interacts with the behavioral inhibition and endocrine systems to increase arousal output in anxiety. Moreover, Gray (1988) also considers the interplay between personality and genetic factors in anxiety disorders in this neurological theory. This model is offered as an integrated, neuropsychological framework, applicable also to other disorders.

Other psychological theories, such as Eysenck’s typology of personality (1967) have a

biological basis, with personality dependent on arousal levels, and genetic determination that introverts are more susceptible to anxiety. This hypothesized theory of dimensions of personality has been tested, for example, in the construction of traits. A neurophysical explanation is central to this psychological explanation, and biological and neurological frameworks, as in Gray, above, continue to be elaborated in the search for the sources of anxiety.

At an early stage of exploring causes of anxiety, Freud posited a biological basis for onset in early childhood (1920). Survival and gratification were the major biologically driven forces, and conflict arising from frustration of these was seen as the precipitant of anxiety, as in separation anxiety arising from loss or absence of a parent. Later investigations of biological factors in anxiety have studied neurological structures, particularly the hippocampal system: this is seen as central to anxiety by Gray (1988), as this system regulates arousal.

Another cerebral structure, the amygdala, sited in the fore-brain, and regarded as the seat of emotional control, has become a key research interest (Le Doux, 1998; McKie, 2002). In an examination of the effects of early experience on the development of affective disorders, the amygdala, along with neurochemical factors, is implicated in neurobiological vulnerability to such disorders, including anxiety (Heim and Nemeroff, 1999). The authors detail evidence, drawn from animal and human studies, which demonstrates the effects of the neurotransmitter corticotropin releasing factor (CRF). Excessive secretion of this was detected as producing stress responses, and anxiety related changes. CRF pathways from the

amygdala are also identified by Heim and Nemeroff (1999) as a major neurological mediator in anxiety disorders.

In the Heim and Nemeroff (1999) study, life stresses, including survival of childhood sexual abuse, and a cerebral chemical “messenger” were suggested as imposing vulnerability to anxiety and other affective conditions. Predisposition to mental health problems of this nature, due to disruption of neural system organization occurring in the developing brain, has been detected in traumatized children, such as those growing up in war zones. Investigations by the Child Trauma Academy in Houston, U.S., have provided evidence of a high frequency of brain abnormality in these child victims: this was explained by discoveries that, while emotional receptors were stultified, receptors for stress were overdeveloped, producing hypersensitivity to stress (Carlowe, 2002).

In an earlier investigation of the implications of neurological dysfunction in children, symptoms of these were described as related to anxiety and withdrawal behaviours by Schaffer, Schonfield, O'Connor, Stokman, Trautman et al. (1985). Neurological “soft signs” were detected among a group of seven year olds, and included “awkwardness”, poor coordination of finger pursuit and fine motor activities, and inability to alternate hand or foot movements rapidly. Although the presence of these signs did not appear to be related to any gross impairment of motor or sensory functioning, a significant relationship was found between presence of soft signs at seven years, and anxiety in later adolescence. The findings

also suggested that existence of soft signs in childhood was a predictor of “psychiatric disturbance” in later years.

A further biological explanation for development of anxiety is genetic predisposition. In a study of 6724 male twins a high correlation was found between presence of Generalized Anxiety Disorder and monozygotic twin status (Scherrer, True, Hong Xian, Lyons, Eiseisen, et al., 2000). Also, relatives of sufferers of this sub-type of anxiety were found to be more likely to present with the same disorder (Noyes, Clarkson, Crowe, Yates & McChesne, 1987). Findings from detailed twin and family studies, which also controlled for family and other environmental influences, support the suggestion that heritability accounts for the development of anxiety disorders.

Review of these predisposition and vulnerability theories might suggest that accessibility for treatment could be limited, and that improvement unlikely, if such conditions are “set”. Biological explanations, for example, that neurotransmitters are involved in anxiety, could suggest that medication is the treatment of choice. Schaffer et al.(1985) studied the regulating effects of medication, for example, on transmitter production and uptake, as in Gray’s outline of the role of anxiolytics in hippocampal activity (1988).

However, it has been shown that medication is not the only answer. Psychotherapy has been found to produce changes in the structures and function of the brain, indicative of improvement in mood (Gabbard, 2000) These have been detected by positron emission

tomography (PET) and single photon emission computed tomography (SPECT). In this paper, Gabbard also postulates that developments in neuroscience which allow detection of alteration in brain function from psychotherapy, also support the case for integration of biology and psychology, for benefit of those who are receiving help and clinicians researching effectiveness of treatments. The influence of genes and environment in stress and anxiety is explored and explained as an action of gene expression: this affects the release of peptides, such as CCF, which directly induce anxiety reactions in response to stress (Herbert, 1997). The interaction between genes and stress-inducing neurotransmitters also impairs brain function and development, as found in the cases of children exposed to the violence of war.

Herbert also welcomes the “erosion of artificial boundaries” between behavioural and neuroscientific studies, and experimental and clinical research. From this perspective, cross-disciplinary research and interventions are needed in the treatment of a range of mental health problems. An integrated approach of the type recommended for these challenges is found in the work of the Institute for Neuro-Physiological Psychology (I.N.P.P.)

1.5 THE INSTITUTE OF NEURO-PHYSIOLOGICAL PSYCHOLOGY AND A BIOGENIC BASIS FOR ANXIETY

Models summarized above theorize that anxiety is underpinned by problems rooted either in unconscious processes, learning and cognitive mechanisms or biological systems. A neurological explanation features among these, and there is also the suggestion that

neurology and psychology can complement each other. This current study has as its focus an investigation based on the integrated approach proposed by the Institute for Neuro-Physiological Psychology (I.N.P.P.). This group originally formed in 1975 with the aim of applying research findings to help children with learning and behavioural problems. This work was extended to the study of anxiety disorders, particularly panic and agoraphobia, investigating the role of central nervous system dysfunctions in the genesis and development of these mental health problems. The origins and rationale of I.N.P.P. theory is discussed in this section.

1.5.1 Background studies

The recognition that dizziness was a cardinal feature in panic and agoraphobia has existed since 1771, when the French physician Sauvages identified the condition “vertigo hysterique”. The source of this was attributed to problems in the vestibular structures in the nervous system. A hundred years later, giddiness reported by agoraphobes in Germany was determined as “platschwindel”, or, “a place which makes people dizzy”, and was seen as due to dysfunctional eye movements (Blythe, 1999).

At the time of these discoveries, knowledge of the architecture of the central nervous system was not at the current and ever-advancing level. However, there was an awareness that there were neurological mechanisms which were not directly accessible for study, involved in maintaining balance, and which were associated with what is now classified as a subtype of anxiety disorder.

Blythe (1999) notes that these early researchers did not identify that balance is regulated by visual and vestibular systems, and that these are both part of the same sensory loop, the vestibular-ocular reflex arc (VOR). This neural circuit is part of the system responsible for organizing sensory information from the environment, in order to coordinate appropriate movements and behaviour. The VOR is laid down in the first year of life, and the entire nervous system, including the brain, spinal cord and central and peripheral circuitry develops and matures from infancy onwards. This development is influenced not only by the health and integrity of the system, but by experiences which promote the progress from early, infantile actions to those controlled by higher, cortical structures.

The sensory visual and auditory neural areas are crucial in receiving, processing and responding to environmental information (Ayres, 1987; Goddard, 1996))

- *The visual system:* here, the second cranial nerve connects the eye, via the optic nerve to the brain, where visual information is processed. In order to receive this information, eyes have to track, or follow it, which means movement of the neck and head. This requires integration of messages from sensory and locomotor systems, necessary for eye pursuit, to distinguish gross and fine detail.
- *The vestibular system:* the eighth, auditory cranial nerve connects specialist sensory ending in the inner ear with the brain stem. Messages from movements in the eyes, neck muscles and limbs are then transmitted to the cerebellum, below the mid-brain.

There are other sensory organs, involved in taste, smell, touch and joint position, all of which are necessary for dealing with sensory information: nevertheless, balance, which is central to the individual's relationship with gravity, is under sensory motor control. The balance control system is the first to develop, functioning at 16 weeks in utero (Goddard, 1996). Adaptive responses to gravity are therefore "built in" to the infant's nervous system. Ayres (1987) describes how the growing child has to interpret sensations from the world around them, whenever their head, body or parts of this are moving. The eyes and the neck are the first parts of the body to be controlled, and information from eyes, ears and neck muscles is shown to be vital both in learning how to control body position and motion and how this responds to gravity.

An example Ayres uses (1987), of falling off a bicycle, demonstrates how balance problems can cause distress. When the bicycle wobbles, and a fall is threatened, the pull of gravity and body movements must be sensed, and the position altered to compensate, correct the angle of the bicycle and avoid the fall. If the changes in body position in space are not sensed, or detected too slowly, then a fall is likely. Without precise, reliable information, and interpretation of this from sensations, the child cannot adapt, could avoid riding bicycles, and therefore fail to practice a skill which can help improve balance. Ayres' research (1987), and further treatises on the "Clumsy Child" postulate links between learning and behavioural problems, and perceptual and sensory difficulties, including poor coordination and balance control (Grimley and McKinlay, 1977).

A biogenic explanation of the relationship between sensory problems and anxiety centres on aberrant or lacking responses: if the environmental information is too difficult to make sense of, the sensory system can become overwhelmed. The part of the central nervous system which acts automatically, the Autonomic Nervous System (A.N.S.), reacts by activating the “fight or flight” mechanism. This action is transmitted by adrenaline, a substance released at nerve endings, with effects on heart rate, pupil of the eye and internal organs, including respiratory, gastrointestinal and urinary systems. Sensations experienced during anxiety can include breathlessness, tachycardia and gastric symptoms, which can be accounted for by the actions of the A.N.S., stimulated by the sensory overload of information. If an individual is about to fall, or interprets external cues as a threat that they will do so, they may not be able to deal with available sensory information in an organized way, and subsequent fear will be sufficient to provoke the fight or flight response. A fear of falling itself can result from vertigo, a dysfunction of the vestibular system, leading to faulty perceptions of the relationship between the body and position in space.

The person’s ability to cope with the external world, and the sense of joint and body position, known as proprioception, can be understood as fundamental in maintaining balance: external and internal states change, however, and as the child grows into an adult their abilities must adapt to changes. At the beginning, the infant’s adaptation is automatic, and intended only to support coping and survival through the first months of life. At this stage, these automatic, infantile movements are not controlled by higher brain functions, which develop as the child grows and matures: they are the primitive reflexes, designed to attract a protector’s attention

and otherwise to promote survival in the case of threat. In the course of neurological and physical progress, primitive reflexes are expected to fade, and become transformed in to adult responses, allowing necessary adaptation to the sensory demands of the environment.

However, there is evidence that this evolutionary process may not be completed, or occur at all, across all reflexes (Goddard, 1996, 2000; Goddard Blythe, 1989; Field & Blythe, 1989)

1.5.2 The Aberrant Reflex

One example of a primitive reflex is the Moro, or “startle” reflex. When a newborn infant senses a sudden change in stimuli, for example position, handling or noise, the rapid response is to fling the arms outward from the body, open the hands and “freeze” momentarily before returning the hands to rest across the chest. This reflex action is accompanied by an intake of breath. The Moro is regarded as the earliest fight or flight response, and as an attempt to grasp onto a safe object, or summon help in the face of danger (Goddard, 1996). As an early, involuntary response, this should begin to abate at two to four months of age. If this or any other primitive reflex is not inhibited, the adult, adaptive response does not emerge.

Retention of the Moro reflex provides an example of consequent problems: these can include problems associated with vestibular structures, such as motion sickness, poor balance, difficulty with physical coordination and dislike of change. Furthermore, generalized anxiety, muscular tension and insecurity have been identified as secondary, psychological

problems (Goddard, 1996). The “near-neurotic anticipation of future events”, and tendency to “shut down” were also observed in cases of retained Moro reflex (Cottrell, 1987). These signs are in keeping with D.S.M.-IV criteria of excessive worry and apprehension classifying generalized anxiety disorder, and freezing, identified with social anxiety disorder. In the DSM IV (American Psychiatric Association, 1994), “freezing” is related to children with this disorder, but Goddard (1989) proposed that freezing, or withdrawal from threat is related to a Fear Paralysis Response (F.P.R.), and can continue into adult years. This phenomenon is seen as resulting from disruption of the “neural clock” (Wolff, 1968). In this case, the Moro reflex itself has not developed, due to a failure of inhibition of an intrauterine reflex, which should not be present at birth.

From investigation of foetal movements and the relationship with Sudden Infant Death Syndrome (S.I.D.S), it has been suggested that the foetus’ movements away from a stimulus area is a manifestation of the F.P.R. This reflex also effects immediate motor paralysis, as in a freezing reaction, acting on respiratory and cardiac functions, muscle tone and vasoconstriction. The F.P.R. is also stated as a “pathway to shock”, and, as one of the most primitive reflexes in the animal kingdom, is outwith cortical control (Kaada, 1986). In the adult, the physiological responses described above are features of anxiety or panic, but in the neonatal infant, with no adaptive capacity, the result could be fatal.

There may be many reasons for part or complete retention of primitive reflexes, or lack of development of postural reflexes, to be discussed below. The role of these retained or

untransformed reflexes was the subject of an I.N.P.P. study reported by Blythe and McGlown (1982). Interest in the “stimulus bound” effect lead to investigation of the reflexes involved in this, and the frequency of their presentation in a group of patients with agoraphobia. Physical coordination, visual perceptual and oculo-motor functions and primitive reflex responses were tested. The “stimulus bound” effect renders the individual unable to disregard irrelevant information in the perceptual field, causing attention to be drawn to the visual perimeter. This sensory dysfunction appears in cases of retention of the Moro reflex, and was suggested by the authors as a possible factor in agoraphobia. This suggestion was also based on the earlier studies positing the relationship between dizziness, panic and agoraphobia. The results of the tests used by Blythe and McGlown (1982) revealed that 73 per cent of participants were found to display residual or retained reflexes, or aberrance of fully transformed ones.

Blythe and McGlown (1982) present results of examination over the years of patients with panic and agoraphobia, and show evidence of dysfunctions in particular reflexes: the Asymmetrical Tonic Neck Reflex (ATNR); Moro Reflex (MR); Tonic Labyrinthine Reflex (TLR), and the postural Oculo-headrighting Reflex (OHR); Labyrinthine head-righting Reflexes (LHR). These patients were classified as stimulus bound, with visual tracking problems. An illustration of how a retained reflex could precipitate an anxious response is also given in the literature. Two companions visit a busy, hot, noisy and brightly-lit store: one, on perceiving these conditions, responds normally, by considering leaving as soon as is feasible, due to a preference to avoid the heat and bustle. There is no panic or attempt at

escape. The other, however, as an agoraphobe, has no recourse to this process of reasoning about the environment and possibilities for coping, as perceptions are directed to the brain-stem, as in the F.P.R., and panic responses ensue. This has been activated by the Moro reflex, which has prevented the agoraphobic person from dealing with the sensory information at a higher, cortical level. Problems in adjusting to environmental changes have also been attributed to retention of other reflexes, and authors other than those from the I.N.P.P have also stated that these continue into adult life (Ayres, 1987).

1.5.3 Effects of Retained and Undeveloped Reflexes

Although these were principally established as a basis for treatment of children, problems arising from primitive reflexes have been cited as causing secondary psychological problems. For example, in the case of the Moro reflex, one of the anxiety disorders arises as a result of sensory system dysfunction, prohibiting rational processing of information. Goddard (1996) relates problems to particular reflexes, as identified in the work by Blythe and McGlown, above. Table 1, below, outlines problems associated with dysfunctions of the reflexes most frequently detected in studies.

Table 1: Retained and undeveloped reflexes and associated problems

REFLEX	ASSOCIATED PROBLEM
ATNR	Eye tracking problems, difficulty in focusing on the mid-line
TLR	Poor balance; oculo-motor dysfunction; visual perceptual difficulties and possible auditory and organization problems
HEAD- RIGHTING REFLEXES	Oculo-motor, spatial and visual perceptual difficulties and motion Sickness

These problems can be seen to be of a sensory nature, involved in visual, vestibular and proprioceptive processing. If these systems are not interpreting information in an integrated way, then adjustment to threat will not be adaptively carried out, as in Ayres' (1987) bicycle-riding example. Fear, as generated by threat, is also a component of anxiety and panic: this may be stimulated not only by genuine threat, but also from misinterpretation and activation of a primitive response.

1.5.4 Possible reasons for failed transformation of reflexes

Causes of the above problems in the relationship with gravity, and impaired adjustment to changing sensory information, is termed neurodevelopmental delay by the I.N.P.P. This is cited as delay or lack of progression through stages of foetal or childhood neural responses.

Possible causes of neurodevelopmental delay have been divided into prenatal, perinatal and infantile groupings. Based on Goddard (1996), these include the following:

Prenatal: anything which jeopardizes the oxygen supply or nutrition of the unborn foetus. These can include maternal behaviours, such as alcohol consumption or smoking, or, alternately, infection, accident or stress.

Perinatal: difficulty with labour, including prolonged labour, forceps delivery, breech birth, prematurity or post-maturity and Caesarian delivery.

Infantile: neonatal jaundice, feeding problems in first six months, or illness, particularly those involving fever or convulsions.

In childhood, an indication of neurodevelopmental delay can be poor performance in physical games or sport. On the other hand, these children may not be encouraged or chosen to participate in sporting activities. Lack of access to opportunities for physical activity is also seen to prevent maturation of sensory responses. The danger of children becoming more sedentary, due to preference for computer games rather than physical ones, and the use of modern baby equipment as a substitute for playing on the floor, are viewed as threats to neural development. Furthermore, overstimulation of some areas, which may result from excessive interaction with an animated screen, may lead to hyperactivity, inattention and short-term memory deficits (Goddard Blythe, 2000).

From the summary above, there are many possible reasons for retention of primitive reflexes and the consequent neurodevelopmental delay. Nevertheless, modification of these influences by adult interventions, and to some extent those generated by the child, are also implied.

1.5.5 Summary

Review of key theories of anxiety reveals different dimensions offered by each: there are unconscious, behavioural, cognitive and biological dimensions, but social and developmental concerns are infused into these as the theories grow and change.

Caro (1998) states that philosophies cannot become integrated at the theoretical level, but that certain moves signal progress towards an integrated model of therapy. For example, personal meaning has become important in cognitive approaches: meaning, and the insight this produces, is central to psychodynamic work, as is the nature of childhood experiences. The latter also features in cognitive therapy, as implicated in the formation of schema and core beliefs (Ramsay, 1998). Moreover, the use of experiential exercises and imagery in the above cognitive accounts, can be explained as narrative methods of eliciting information on personal constructs, from the accompanying material. The narrative content is the “story” that patients tell in the therapeutic setting, and neither psychodynamic nor cognitive therapies could proceed without this.

There are also common themes in other approaches. For example, in narrative work, “narrative repair” allows modification of constructs, just as, at a fundamental level, schema have slots for assimilation of new material into existing representations in memory. Common themes also occur between Bandura’s construct of self-efficacy (1969), formulated to understand change in therapy, and viewed as similar by Ramsay (1998) to generation of problem-solving options in cognitive reframing. As Caro (1998) further suggests, integration of therapies could become chaotic, but should be aimed at respecting differences between cultures, settings and individuals, and should lead to improvement.

Theories evolve with changes in technology and scientific findings, and each “new” theory seeks to “better” the previous one, but also appears to share some of the concepts. As

discussed above, there are signs that therapies are moving towards increased integration: also, as Yapko (1994) points out, every problem exists in varying dimensions, therefore views such as Herbert's (1997), on the need for interdisciplinary dialogue and research, can be seen as pertinent to the study of anxiety.

Returning to a neuropsychological perspective, as Ayres (1987) describes, and Blythe and Goddard (2000) have detected, effects of impairment of sensory systems can persist into adult years. There are also suggestions, however, that preventative strategies, such as health-related behaviours and encouragement to play and interact socially can promote neural progress. The retention of primitive reflexes is postulated as a substrate of agoraphobia and panic in this developmental model. As anxiety is a cardinal feature of these, it is possible that primitive reflexes could underpin other sub-types of anxiety. If so, it is also possible that those experiencing anxiety might benefit from interventions derived from this explanatory, physiological framework. These will be among the treatment approaches summarized in the concluding section of the introductory chapter

1.6 TREATMENT OF ANXIETY

Difficulties in describing psychotherapies lie not only in specifying an ever-growing field of modalities, but also in the possible lack of congruence between diagnostic classification and problems as defined for psychotherapeutic intervention (Last & Hershen, 1988)

In this section, brief outlines of the structured treatment approaches derived from major theories will be presented, and developments from these will be reviewed: following this, treatment outcomes will be discussed.

1.6.1 Psychoanalytic and Psychodynamic treatment

The theories and associated treatments have been re-interpreted and extended by Freud's contemporaries and later practitioners (e.g. Horney, 1937; Sullivan, 1938; Fromm, 1947)

The aim of psychoanalysis was to identify forgotten, earlier trauma, and by means of the therapeutic alliance, express these. This original aim of catharsis, evolved into methods for "penetrating unconscious meaning" (Stevens, 1983), in other words, achieving insight. Although psychoanalytic psychotherapy, with treatment length of up to more than a year, continues to be practiced, approaches such as focal psychodynamic therapy offer short-term treatment in comparison (Department of Health, 2001)

Psychodynamic treatment has been described as "especially valuable" by Busch and Milrod (2002), as its broad scope of enquiry matches well with the complexity of psychological problems. These authors set out the core aspects of this mode of treating an anxiety disorder in three stages: identification of defence mechanisms, exploration of conflicts, and introduction of more realistic ways of coping with conflict and their associated emotions. The authors also highlight a lack of evidence for long-term efficacy of C.B.T. and medication, and the persistence of impaired functioning and anxiety symptoms following short-term relief. Problems with personal relationships are seen as

the central factor in development of panic by Busch and Milrod (2002), who argue that the nature of these should be investigated.

Not only did social and interpersonal factors become infused into revisions of psychodynamics, but central components of some innovative theories also rest on this theory. For example, stressing the link between somatic and psychological elements of problems, psychotherapy known as Core Energetics addresses blockage of energy, seen as creating imbalance between the internal self and the outer world (Cranmer, 1994). This prevents acceptance and expression of aspects of the personality. Treatment methods involve heightening the patient's awareness of muscular tensions indicating the area of obstructed energy.

An associated approach, post-Riechian therapy, also draws directly from Freudian concepts, this time of trauma occurring before birth or during childhood, and neurosis as sexual energy (West, 1994). However, the mind-body link is important here in questioning self-destructive thoughts and feelings, and releasing potential for growth. Awareness of the body is part of therapy, as is contact and breathwork, to free up tension and rigid thinking.

1.6.2 Treatment based on learning and personality theories

Learning theories evolved into studies of behaviour, but the role of conditioning in this is also a component of personality theory. Unhelpful behaviours, which result from the

associations between these factors, are the subject of treatment (Barlow, 1988; Marks, 1987)

In the case of anxiety, an anxious response can lead to avoidance. From a personality-based perspective, this develops due to biological disposition, and each exposure to social contact reinforces the conditioned stimulus of anxiety. Treatment based on learning and classical conditioning theory would carry out systematic exposure, desensitizing the patient (Wolpe, 1958). The therapeutic alliance here is applied to enrolling the patient in their treatment, from the assessment to the practiced exposure steps.

Current behaviour research and treatment has expanded the focus from extinction of unwanted responses to study, for example, of parenting styles and likely impact on the development of anxiety, as in Hudson and Rapee (2001), discussed above. Behavioural approaches are combined with cognitive therapy (Clark, Salkovskis, Hackman, Anastasiades & Gelder, 1994) to offer one of the most commonly used treatments, while, in terms of personality, Kelly's early Role Construct became repertory grid technique (Kelly, 1966). Interpretation of grids representing patient's constructs, or perceptions of themselves in comparison to groups or individuals serve as measures of change, from experimentation with new, desired roles in relation to identified figures. In anxiety, this could involve the Sociality corollary, encouraging the patient to recognize that not only do others have an effect on them, but that they also have a role in the social process.

Behavioural treatment exists less as a discrete approach, than as a strand of cognitive-behavioural therapy. However, the technique of graded exposure has been evaluated as effective in a range of anxiety disorders (Department of Health, 2001), and optimism for change in interactional dimensions is offered in Kelly's framework (1955) of experimentation with roles

1.6.3 Cognitive treatment of anxiety

Despite claims from the theory of personality that anxiety responses are not under cognitive control, cognitive research has shown how attention is influenced by anxiety, with the result that information processed as threatening becomes the focus (Mathews, May, Mogg & Eysenck, 1990). Moreover, particular styles of thinking and self-talk have been identified with affective disorders (Beck, Rush, Shaw & Emery, 1979), and particularly anxiety disorders (Wells & Clark, 1994).

Again, the therapeutic alliance would aim at collaboration, in framing hypotheses about the condition, identifying negative automatic thoughts and automatic assumptions. When these have been clarified, an agenda for treatment would be set, to address goals. The patient may be asked to carry out homework: for example, keeping a diary, with records of events, actions, negative thoughts or assumptions, and effects of applying realistic, alternative ones, negotiated with the therapist.

Challenging automatic thoughts, for example, perceptions of others and how the patient thinks they appear to them, and supporting a move to recognition of achievements, rather than an internal focus on themselves as a failure, would also feature. Teaching relaxation skills, or the use of imagery to manage anxiety could also be incorporated into cognitive treatment (Clark, 1989).

Progressing from the use of imagery, recent shifts in CBT are described by the authors (Segal, Williams & Teasdale, 2002). They describe their adoption of mindfulness, in tandem with the concept of beliefs and meaning derived from interactions with the world as a bold move away from their strict C.B.T. training.

Developments such as the encouragement of awareness without judgement, also an aspect of phenomenological work, evolution of a cognitive and analytical model, and the move described by Segal et al. demonstrates infusion of experiential considerations into a cognitive approach. Similarly, the infusion of narrative elements in cognitive approaches suggests attempts to reconcile the tension between rationalist and constructive views of this model.

1.6.4 Biological approaches to anxiety

If this condition is genetically determined, a manifestation of hyperactivity of neural structures, or a problem with neurotransmitter secretion or uptake, then medication might appear to be the only route to improvement. Particular drugs can act on the

nervous system, processes and structures within this to modify the factors influencing anxiety. The Benzodiazepine group of drugs has been used as "first aid" for anxiety states, but there are risks of dependence. Diazepam, the best known, is standard, longer acting and may be prescribed to help with sedation, anxiety relief and muscle relaxation. Due to the dependency issue, an alternative would be more likely to be prescribed, for example a beta-blocker, especially if palpitations, hyperventilation or other autonomic nervous system symptoms are experienced. There are also other drugs such as selective serotonin reuptake inhibitors (S.S.R.I.'s) and other antidepressants found to have varying degrees of success in treating anxiety disorders.

However, the move towards alternatives to medication could lead to other interventions. For example, although personality could determine anxiety, an exposure programme could be aimed at strengthening links between positive outcomes resulting from encounters, through conditioning. Moreover, the patient could learn to manage physiological components of their anxiety, by means of progressive muscular relaxation, controlled breathing, imagery or combination of these, dependent on their effectiveness. Core Energetics or post-Reichian therapy would also concern themselves less with the interplay between neurological and endocrine determinants than the manifestations of their effects in physiology.

A treatment plan could therefore include information about anxiety and the role of the physiological processes in maintaining this, or the use self-awareness, for example



scanning for tension and applying learned skills to reduce this. Integrated physiological and psychological approaches, include that offered by the I.N.P.P. This could be viewed as more structured than the unorthodox therapies outlined above, and a choice which would offer an option to medication.

1.6.5 Treatment outcomes

Major developments in the range of treatment for anxiety are outlined above. There are reports in the relevant literature that particular interventions are superior to others, with highest rates of improvement, longer-term effects and greatest acceptability to patients. For example, the benefits of benzodiazepine medication are described as “extremely useful” in treating chronic anxiety (Bazire, 2001), and benzodiazepines and S.S.R.I.’s achieved varying degrees of success in treatment of adolescents (Velosa & Riddle, 2000). However, treatment studies have shown no difference in improvement between one group of anxious patients given medication and another who were not (Catalan, Gath, Edmonds & Ellis, 1984). Similarly, Rachman (1998), states that there is no medication which has been proven to be effective in generalized anxiety disorder. Furthermore, in patients suffering from this anxiety sub-type, objection to medication was cited by Marks and Dar (2000) as one of the reasons for 30 per cent of patients’ failure to start or complete treatment over 22 years. Marks (2002) also states, from review of literature, that prescribed drugs are less effective than psychotherapy.

The above are reports of “drop out” rates, and levels of effectiveness for some groups of patients, but not for all. Psychological treatments for phobia and panic have an important behavioural component, as discussed above, but the cognitive aspects of anxiety have lead to application of cognitive approaches, or combined these with behavioural therapy. These approaches have been developed and presented as valuable alternatives to anxiolytic or behavioural approaches alone, (e.g. Hawton, Salkovskis, Kirk & Clark). This recommendation appears to be supported by results of 41 per cent improvement in endstate functioning, measured by scores on anxiety measures, resulted from a randomized trial of cognitive-behavioural treatment for anxiety and depression in older adults (Barrowclough, Paul, Colville, Russell, Burns & Tarrier, 2001). Moreover, Clark (1999) reported that 71 per cent of patients with panic, were symptom-free after cognitive therapy, and that brief cognitive therapy produced sustained improvement, at 79 per cent panic-free at one- year follow-up.

From extensive meta-analysis of psychological therapies and their outcomes, cognitive behavioural therapy is recommended as an effective response to a range of anxiety disorders, where symptoms are marked (Department of Health, 2001). Exposure and cognitive based methods are reported as effective: however, these results are achieved in “those who can tolerate” these interventions, and, although evaluation of CBT provides highest rates of evidence, the report also warns that this does not mean other treatments should be judged to be ineffective. Furthermore, “modest” improvements were reported

in 50 per cent of patients with generalized anxiety disorders achieving normal functioning following psychological therapy (Durham & Allan 1994), and 50 to 60 per cent recovery rates at 6 months in a group treated with cognitive and behavioural methods (Fisher & Durham, 1999).

Marks (2002) also notes that there are treatments are effective for some patients, but not for all, and that the “tangled thicket” of treatment factors make it difficult to clarify the factors responsible for reported varying levels of success. One such factor is therapeutic alliance, held to be an important influence on outcome (Barber, Jaques, Connolly, Crits-Cristoph, Gladis & Siqueland, 2000). Psychodynamic practitioners see this as central to this therapy, but the Department of Health review found little evidence of evaluation of psychoanalytic therapy. Although they suggest that this approach provides relief from anxiety disorder as rapidly as pharmacological or cognitive behavioural interventions, in their current discussion, Busch and Milrod (2002), state that this mode of treatment has not been systematically tested.

The Department of Health report (2001) also indicates some of the problems in identifying treatments of choice from their outcomes. These arise from problems in paucity of studies, especially for those which lie outside the range of standard therapies, such as C.B.T., or are in the early stages of trials in established service delivery systems, such as the N.H.S. Other difficulties occur from the use of randomized control studies

(R.C.T.'s): in between-group studies, randomization may produce effects where preference for one particular treatment arises; "drop-out" and reduction of sample sizes create difficulties with interpretation of findings, and manualization does not necessarily ensure optimum delivery of treatment.

Another possible problem with R.C.T.'s, that the researcher may favour their own adopted treatment approach, is also highlighted by the World Health Organization (W.H.O., 2000) as a potential flaw in outcome studies. One of the chief arguments here, however, is that manualized treatment does not only fail to prevent poor intervention quality, but it does not match the disparity and complexity of problems faced by therapists in the "real world". Furthermore, patients enrolled in R.C.T.'s are often selected on the basis of a classifiable single disorder. The use of research on treatment delivered by "ordinary" therapists, with "ordinary" patients and settings likewise, over the reliance on R.C.T.'s is therefore urged by this global agency.

As stated above, the complex nature of treatment factors, and of anxiety disorders themselves, renders it difficult to clarify the important factors in success or failure of outcome. Issues of therapeutic alliance, chronicity of the problem and accessibility of treatment are only some of these. What can be noted, however, is that, if 50 per cent of treated patients improve, then half of the group does not. Varying levels of success reported indicate that there is a population of patients with anxiety disorders, who either

have difficulty with treatment or are treatment resistant, and do not achieve normal levels of functioning. In examining reasons for the genesis and persistence of anxiety, and why some patients fail to improve, while some psychotherapeutic treatments seek to identify these through exploration of emotional and cognitive phenomena, biological approaches find sources in physiological structures and their functioning. Given that many anxious patients do not improve, application of an integrated model may advance the understanding of complexities highlighted by Marks and others.

1.6.6 The I.N.P.P. remedial programme

The integrated I.N.P.P. model adopts a physiological-psychological approach: if anxiety disorders result from central nervous system dysfunction, and are expressed in retained primitive reflexes, then treatment will be aimed at inhibiting these reflexes and encouraging development of the adult responses. Dependent on the reflex to be inhibited, movements to achieve this are carried out slowly and deliberately, in a sequence: for example, in a case of sensory difficulties in an adolescent, the patient carries out daily exercises, clenching and unclenching fists, or curling into a ball; vestibular problems, associated with a retained Moro reflex and causing balance problems, are addressed by temporarily increasing the reflex responses, after which the effects of this diminish. This is achieved by spinning the patient briefly, with reported results of reduction in muscle tension and fatigue, associated with anxiety. Noel (1999) reported observed improvements in balance, physical and emotional states occurring from these remedial exercises.

Biological plausibility for an approach of this type is founded on the interplay of different areas of receptors, including skin, muscle and tendons, along with visual and auditory system: in the model devised by Bobath (1975) the central nervous system looks for contrasts in order to interpret position and sensation. Postural stability must be “turned on” first in development, so stability is established. This incorporates transmission of messages from the spinal column, but also from central programme generators (C.P.G.s). These are regions of the spinal cord, basal ganglia and premotor cortex which store “programmes” of learned movements and automatic postural adjustments, and these can add new information about voluntary actions. This neurological plasticity means that movements designed to counteract, for example, dysfunctional postural responses can be introduced through repeated practice, and the original problematic movements re-programmed by the C.P.G.s to adaptive, adult postural responses.

With a background in established physiological treatments for neurological problems with secondary psychological effects (e.g. Bobath, 1975; Ayres, 1987), I.N.P.P. methods would provide a non-medical treatment which also involves a therapeutic alliance, enrolls the patient in their treatment and aims at generating a sense of control over their anxiety disorder.

1.7 AIMS AND HYPOTHESIS

1.7.1 Summary

Psychological treatments for a range of anxiety disorders have been developed from theories and study of these. Evolution of these has been a feature of growing sophistication in research methods, improvements in explanatory frameworks and increase in understanding. Application of these to treatments has been tested and reported, to provide empirical evidence of effectiveness, or suggest modifications: however, for anxiety, as for other disorders, responses to treatment have been recorded as variable. This suggests that there could be a population of patients whose anxiety disorder may not be addressed by standard methods, because these deal with the symptoms, not the source of these. Although pharmacological remedies may seem to answer the question of biological reasons, clinicians increasingly turn to treatments which avoid medication, for a variety of reasons. The benefits of a dialogue between physiological and psychological approaches have also been posited, as has the relationship between sensory system difficulties and anxiety.

1.7.2 Aims

Studies of retained reflexes in people with anxiety disorders have been varied in their methods: for example, either sample sizes have been small, in some cases less than ten, or control groups have not featured. Also, while surveys provide a range of information, these are dependent on subjective reports, with corresponding types of measures from

these. The focus on panic and agoraphobia, due to the associated levels of arousal and C.N.S. activity is understandable, but limits interpretation of findings about reflexes to these specific disorders.

The status of all participants in the studies is also unclear: although some are reported as patients receiving treatment from an allied health professional, characteristics of populations involved in the larger scale survey and testing procedures is not always clearly identifiable. Review of background literature and recommendations for outcome studies highlights the complicated nature of anxiety, therefore study of the presence and effects of primitive reflex problems in a wider group of anxiety disorders is justified.

Based on these issues, this study aimed to investigate whether a group of patients with a diagnosis of generalized anxiety, and in receipt of treatment for this, would present with retained primitive reflexes, or undeveloped postural reflexes, and whether particular reflexes associated with anxiety-related features would be detected. Association between duration of anxiety and reflex scores was also to be explored. Methods of identification of presence of reflexes, and levels of retention were based on the I.N.P.P. measures. The latter were derived from existing neurophysiological instruments, and the establishment of the possibility of the measurement of signs of sensory problems.

1.7.3 Hypotheses

Hypothesis 1

Application of I.N.P.P. reflex tests will result in a difference between the scores from a group of patients with anxiety disorders and a group of non-anxious controls: patient participants will achieve higher scores, indicating presence of retained primitive, or undeveloped postural reflexes.

Hypothesis 2

There will be a positive correlation between patients' age of onset of anxiety and reflex test scores. The data will also be explored for other factors, including frequencies of particular reflexes and relationships between measures of anxiety and reflex test scores.

CHAPTER TWO: METHODOLOGY

METHODOLOGY

2.1 Design

A between-participants design was used in the study. Two groups of 26 adults were enrolled, one of control participants and one of patients. Both groups were assessed by means of a Beck Anxiety Inventory, followed by testing using measures developed by the Institute for Neuro-Physiological Psychology (I.N.P.P.).

The Tayside Committee on medical ethics granted approval for the study. Reassurance was sought that the patient participants have existing diagnosis of an anxiety disorder, but the design and procedures to be employed were approved without any requests for amendment.

2.2 Participants

Patient participants were referred to the study by clinicians from whom they were receiving treatment for anxiety disorder. The criteria for inclusion in the study were a primary diagnosis of anxiety, occurring in adults aged 18 to 65 years. Exclusion criteria were severe depression, psychosis or substance-induced anxiety, and a score of less than 16 on the BAI. Thirty patients were originally approached: three felt they were unable to participate due to the excessive nature of their anxiety, and one did not

respond to written contact. From the recruitment and screening procedures, 26 patients were successfully enrolled.

The control group members were adult volunteers. Requirements for controls were as follows: no current treatment with anxiolytic medication; that they had not been a “clumsy child”, characterised by inability to ride a bicycle, difficulty in catching a ball, and other signs of poor co-ordination, and that they score no higher than 8 on the BAI. Of the 28 adults agreeing to acts as controls, two were excluded when they revealed childhood experiences of co-ordination difficulties.

Patients were referred to the study by different disciplines involved in the treatment of their anxiety. Details of referral sources are showed in Table 2:1 below.

Table 2:1 Referral Sources for Patient Participants

Psychologists	13
Consultant Psychiatrists	7
Occupational Therapists	3
Community Mental Health Nurses	3

16 of the patient group were female. Control group members were recruited to match

the patient group distribution. Age distributions for the two groups were outlined in Table 2:2 below. Graphical representation is included in figure 6, Appendix 6.

Table 2:2 Ages: Patient and Control Participants

AGES	PATIENTS	CONTROLS
Range	22-61 years	20-61 years
Mean	41.9 years	42.1 years
Standard Deviation	11.57	11.60

All data from the study were analysed using the Statistical Package for Social Sciences (SPSS) for Windows 98, Version 10. Where appropriate, data were investigated for distribution and comparison of means. From analysis of distribution of ages of patients and controls and skewness and kurtosis were within normal bounds.

Comparison of means between both data sets for ages was carried out using an independent samples t-test. The resulting $t(50) = .072$; $p > 0.05$ revealed no significant difference between the two groups' ages.

2.3 Measures

For the purpose of this study, a Beck Anxiety Inventory (BAI) was used as an initial measure (Beck & Steer, 1993). Following this, the tests developed by the I.N.P.P. were carried out to detect the presence of any retained primitive reflexes.

2.3.1 The Beck Anxiety Inventory

This was provided for each individual in each of the two participant groups, to assess levels of anxiety. With regard to the control group participants, this questionnaire was applied in order to avoid inclusion of any identified as experiencing anxiety, therefore unable to act as a comparison for patients with this diagnosis. The BAI is a self-report method of rating severity of symptoms associated with anxiety, designed to avoid overlap with measures of depression. The 21 items are expressed in somatic or psychological terms, scored on a 4-point scale, from “not at all” to “severely, I couldn’t stand it”.

The factor structure has principal components of somatic anxiety, fear and panic. Cluster analysis reveals neurophysiological, subjective, panic and autonomic factors: scores of 0-7 indicate normal levels of anxiety, 8-15 mild to moderate, 16-25 moderate to severe, and over 26 as severe.

The BAI has been evaluated as demonstrating good factorial validity, with the emergent somatic and subjective anxiety factors providing a useful, brief method of identifying anxiety disorders in older adults (Kabacoff, Segal, Hersen and Van Hassel, 1997). In another analysis, the BAI was viewed as measuring panic attacks, due to similarity of items within the measure to symptoms of panic in outlined the DSM-IV (Cox, Cohen, Direnfield and Swinson, 1996). However, the authors also noted the popularity of the BAI, and its facility in distinguishing anxiety from depression. Similarly, the measure is cited as an important tool in identifying anxiety in a primary care population (Ferguson, 2000). Without such a measure, the author sees patients with anxiety disorders as at risk of misdiagnosis or failing to be identified in a primary setting, and developing further problems as a result. The BAI was selected on the basis of the above, for relative ease of use, and with the aim of ensuring adherence rates.

The version of the BAI used in the study is in Appendix 5.

2.3.2 The I.N.P.P. Reflex Tests

These measures were developed by the I.N.P.P., based on the standardised tests carried out on newborn infants, and from studies where the application of these modified tests revealed a link between aberrant reflexes and specific learning difficulties in children (Field & Blythe, 1989). The aim in testing newborns is for careful examination and

observation of any neurological abnormalities (Forsyth, 1991; Lingam and Harvey, 1988; Sheridan, 1994). The primitive reflexes allow the infant to respond and adapt to changes in their environment, are innate and the earliest manifestations of survival behaviours.

However, as these responses are automatic and governed by the brain-stem, inhibition normally occurs as higher centres in the brain, and development of the nervous system exert their influences in the following weeks and months of life. The presence of infantile reflexes still after 6-12 months is a cause for concern: retention of these can affect the child's attainment in physical areas, such as posture in response to changing environmental demands, for example, at school or play.

Further problems may involve behavioural or learning difficulties, and it is these physiological, psychological and behavioural factors which had led to the adaptation of the neonatal reflex tests for use with children and adolescents. For these two groups, 15 reflexes are tested, also as part of a full neuro-developmental examination, but directed here at identification of any aberrant reflexes.

For each of the original tests, the child is placed in either a supine, prone, standing, kneeling or sitting position. They are then asked to respond either to a stimulus such as

the touch of a brush on the palm of the hand, or an alteration in the positioning of their line of vision or angle of their upper body or limbs. None of the movements are large or demanding, and are guided all by the tester.

The Moro reflex test is an example of a neonatal test adapted for use with more mature subjects: in infants, the procedure is to hold the baby securely in a supine position, slightly dropping the hand supporting the infant while maintaining the hold. The infant normally reacts by freezing, rapid inhalation and sudden, symmetrical opening of the arms before closing them to a grasping position. For adults, the tester kneels or stands behind the participant, who is required to lie supine on a floor or couch, with arms at their sides. The head is supported in the tester's hands, then dropped slightly as in the neonatal test with the infant. The participant is instructed to move their arms across their chest as soon as they feel their head drop. Observations for any responses by the adult similar to those seen in the infant, outlined above, are carried out.

The presence of retained primitive reflexes, or undeveloped postural reflexes, is seen as related to particular problems for the child. In the case of an aberrant Moro reflex, which should be inhibited at 2-4 months of age, the child may be "over-reactive, hypersensitive, stimulus-bound" and have difficulty with ball games. Similarly, the failure to develop the ability to return the head to an upright position when the body

has been tilted slightly, detected by the Head-righting test, is related to visual, perceptual and co-ordination difficulties (Goddard, 1996). All the above would not only affect performance at school, but could interfere with the development of broader, crucial communication and coping skills for adolescent and adult life.

The I.N.N.P. was originally established with the aim of researching the influences of central nervous system dysfunctions on children with specific learning difficulties. However, reference to literature concerning adult anxiety and phobias, dating from the 18th century to the present, highlighted increasing suggestions that there could be a physiological basis for these conditions. In particular, reports of “giddiness” in agoraphobic patients, and results from research into the involvement of vestibular problems in patients suffering from panic and anxiety, strengthened suspicions that central nervous system deficits may be a primary factor.

From the mid-seventies on, Blythe and others at the I.N.P.P. (Blythe & McGlown, 1979, 1982; Blythe, 1999; Goddard, 1996; Goddard Blythe, 2000) investigated the phenomena of balance and oculomotor difficulties occurring in adults diagnosed with anxiety and panic disorders. The I.N.P.P.’s “Neuro-Developmental Screening Questionnaire” was developed as part of the initial assessment for presence of central nervous system (CNS) deficit. Results from an analysis of 105 completed

questionnaires were presented at the second International Conference on Neuro-Developmental Delay in 1988: 97 (92 per cent) of the total reported visual problems such as photosensitivity and focusing problems, while 96 (91 per cent) reported balance problems.

Other researchers had highlighted the presence of vertigo and abnormal balance responses, but Blythe and his colleagues strove to investigate *why* anxiety sufferers had these impairments. They applied neuro-physiological tests with agoraphobic patients, subsequent to the screening questionnaires: findings from the tests were that 75 per cent of those tested presented with clusters of retained primitive reflexes, and lack of transformed ones, along with visual focusing and balance problems. (Blythe and McGlown, 1979, 1980). These results pointed to underlying central nervous system deficits, as the neurological mechanisms involved in visual, motor and co-ordination processes in these participants did not appear to exert mature, CNS deficits were the primary factor, with behavioural, or "neurotic" symptoms as secondary (Blythe and McGlown, 1982).

The above findings from I.N.P.P. studies, and the fact that persistence of uninhibited primitive reflexes result in particular neurological deficits which can be measured

(Capute and Accardo, 1991), strengthened the case for use of primitive reflex testing in anxious adults who report such dysfunctions.

The reflex tests used in this study are drawn from the battery devised by the I.N.P.P. (Goddard, 1999), which list the following tests:

- Moro Reflex Standard
- Moro Reflex Erect
- Palmar Reflex
- Asymmetrical Tonic Neck Reflex Standard
- Asymmetrical Tonic Neck Reflex Schilder
- Rooting Reflex
- Suck Reflex
- Spinal Galant reflex
- Tonic Labyrinthine Reflex Erect
- Symmetrical Tonic Neck Reflex
- Landau Reflex
- Amphibian Reflex Prone-Supine
- Segmental Rolling Reflex Hips-Shoulders
- Oculo-Headrighting Reflexes
- Labyrinthine Headrighting reflexes

The scoring for the tests is as follows:

A scale of 0-4 is used.

0 = no abnormality detected, i.e. no evidence of a primitive reflex, or the postural reflex appears fully developed.

1 = evidence of a primitive reflex to 25%, partial absence of a postural reflex to 25%.

2 = residual presence of a reflex to 50%, underdeveloped postural reflex to 50%.

3 = virtually retained reflex to 75%, virtual absence of postural reflex to 75%.

4 = retained primitive reflex 100% present, complete absence of postural reflexes.

Detection of presence or absence of reflexes is guided by the specific signs, detected from responses to requested changes in posture or attentional focus, as described in the guidelines for each test. For example, in the Moro Reflex test, A score of 0 would be assigned if, while in the supine position, the participant immediately clasped hands on

request. Absent or outward movement of the arms, corresponding to the neonatal response, would score 4.

For the purposes of the study, six of the I.N.P.P.-derived tests were selected after consideration of the issues outlined below.

Following piloting with adult control volunteers, the full range of tests were not used, for reasons outlined here: the original battery was designed to be used with children and adolescents, aimed at identifying particular behavioural and learning problems affecting educational progress and attainment; certain tests involve asking participants to carry out postural changes which are then checked or supported by the examiner, for example, by placing hands under the participant's lower back or moving their limbs; also, for some of the measures, postures included kneeling and all fours, or falling back to be caught by the tester. Where two tests were available, the one without the requirement for possible invasive contact, or potentially stressful postures or movement was adopted, following consultation with Dr. Peter Blythe, at the I.N.P.P. (Blythe, personal communication, 2002).

In addition, specific reflexes are hypothesised as present in patients with anxiety disorders, particularly the Moro, Oculo-Headrighting and Labyrinthine Headrighting

reflexes (Blythe & McGlown, 1982). In adapting the tests for use with adults from 18 to 65 years, diagnosed as suffering from anxiety disorder, key considerations were for minimizing distress or discomfort, while investigating for the presence of a range of reflexes, including these noted in existing literature. The original set of tests was to include the Asymmetrical Tonic Neck Reflex, but this was precluded following consultation with Dr. Blythe, who advised that this particular test was not applicable in those aged over eight years. However, those selected were approved as appropriate instruments for this study (Blythe, personal communication, 2002).

Following the above consultation and selection processes, the chosen tests and the procedures involved in carrying these out were as outlined below.

Asymmetrical Tonic Neck Reflex-Schilder: the participant is asked to stand, feet together, with arms held straight out in front at shoulder level, and hands relaxed at the wrists. The tester stands behind, and gently turns the participant's head to the right, holding it there for 10 seconds, then back to the midline for 10 seconds, repeating this movement to the left, again for 10 seconds. While their head is being turned to the right and left, the participant is asked to keep their arms straight out in front. The sequence is repeated four times, the tester observing for any movement of the arms in the direction which the head is turned, as this suggests presence of this reflex.

Tonic Labyrinthine Reflex Erect : the tester stands behind the participant, who is asked to stand with feet together, arms relaxed at their sides. The tester then slowly tilts the participant's head back to the extended position, asking them to close their eyes, hold this for 10 seconds, then tilt their head forward as if looking at their toes, but with eyes closed, again for 10 seconds. The tester observes for any loss of balance or change in muscle tone, for example "gripping" the ground with toes to regain balance, which indicates problems with labyrinthine functioning.

Palmar Reflex: the participant stands upright, arms held out in front, flexed at the elbows, palms turned upwards. The tester strokes along the creases of the palm with a soft brush. Movement of thumbs or fingers inward, or participant's reports of heightened sensitivity in the palms in response to the stimulus of the brush suggests presence of the palmar reflex.

Oculo-Headrighting Reflex: the participant sits on the floor or a couch, with legs outstretched in front, arms resting on their thighs. They are then asked to focus on an object at eye level in front of them. The tester, positioned behind, holds the participant's shoulders gently, and tilts them to the left in three stages, pausing at 15, 30 and 45 degrees of the angle of tilt, then returning them to the upright position. This procedure is repeated to the right, then backwards and forwards, in stages as before. Movement of the head in the direction of the tilt, "flopping" of the head, or leaning in

the opposite direction are regarded as signs of retention of the Oculo-headrighting reflex.

Labyrinthine Headrighting Reflex: the participant remains in the seated position as for the Oculo-headrighting reflex test above, and is asked to follow the same procedures, but this time with eyes closed, imagining that they are looking at the object. Again, the tester notes the head position, and any changes in this during the upper body tilting, which could indicate presence of the reflex.

Moro Standard Reflex: the participant lies prone on the floor or on a couch, with legs relaxed and arms resting by their sides. Their shoulders are supported by a cushion, and the tester, positioned at their head, supports the patient's head 5 centimetres above the level of the shoulders. After 10 seconds, the tester allows the participant's head to drop to be supported again at 5 centimetres above the floor, at which point the participant is asked to quickly clasp their hands across their chest. Any failure to move the arms, movement outward rather than inward, or delay in hand clasping is noted as representative of the Moro reflex.

A graphical representation of the version of I.N.P.P. reflex tests and scoring guidelines used in this study are in Appendix 8.

2.4 Observation of Testing Procedures

Before carrying out the tests with patient and control groups, procedures involved in administration of these were observed in a paediatric out- patient setting. In Tayside, as part of a multi-disciplinary assessment of children suspected of suffering attention deficit and hyperactivity disorder (ADHD), screening is routinely carried out by means of measuring performance on motor and attentional tasks by an occupational therapist specialising in assessment and contribution to treatment of childhood mental health disorders. The range of tests used in this service include those adapted and used in the I.N.P.P. framework. Assessment is carried out in the hospital-based clinic facility, where the author was permitted to observe the procedures in detail.

Permission was obtained from the children and their parents to allow the above. In these cases, the aim was to assess muscle tone, independent eye closure, tongue and lip movements, and, as in the I.N.P.P. tests, co-ordination, balance and eye pursuit.

To observe performance on the last three areas, tests including those to be carried out in this current study were used in the child assessment sessions. The main differences between procedures in the paediatric and adult settings involved the equipment used and the postures the children were asked to adopt. For the version of the Oculo-Headrighting and Labyrinthine Headrighting tests, a toy was held up for visual

focusing, and the Asymmetrical Tonic Neck Reflex and related tests were observed while the child knelt on a mat. In the adult equivalents, participants are asked to focus visually on a fixed point ahead of them, while seated on the floor. With the children, the occupational therapist also physically repositioned or guided the child, using close interpersonal contact or touch. It was felt that this level of physical contact could be potentially threatening, or otherwise anxiety-provoking to some adults, as mentioned above.

However, there was little difference in how other tests, such as the Schilder (Appendix 8), would be carried out for children or adults, and it was felt that the clear and paced verbal instruction style and use of eye contact to reassure could also be used with I.N.P.P. test participants here.

2.5 Procedures

Patients to be included in the study were identified and initially approached by clinicians with whom they were already in contact. A Patient Information Sheet was given at this stage, and those who agreed signed the Tayside Ethical Committee standard consent form. Copies of the Information Sheet and consent forms are in appendices 2 and 3.

A BAI was carried out with participants in both groups. For the patient group, this was to assess levels of anxiety, as those to undergo INPP tests would be patients who scored 19 or over, indicating moderate or higher anxiety levels. In those acting as controls, an anxiety score of 9 or less was required, to obtain a comparison group who had minimal, or even no anxiety.

Following the screening procedure, patients who fulfilled the inclusion criteria, and who agreed to participate, were tested using the six selected IN.P.P. measures. The researcher was in contact with Dr. Peter Blythe, from the I.N.N.P. at all stages before and during the procedures, to ensure selection of appropriate tests, and adherence to testing methods.

Tests were carried out in interview rooms, either in the patients' GP surgery (3), a mental health resource centre (2) or in the Clinical Psychology Department (4). The remaining 17 participants were cases where levels of patients' anxiety prevented them from travelling to their local health centre or to the Psychology Department, therefore it was necessary to carry out the tests in their homes.

It was ensured that equipment to be used for the procedures facilitated testing, and was matched exactly, or as near as possible, in each case. Equipment included an

examination couch, or in patients' homes, a surface to lie or sit up on, usually a sofa or a carpeted floor: a cushion to support participants' upper shoulders during the Moro Reflex Test and a moveable, coloured sticker acting as an object for visual focusing. These were available in all settings. For all tests carried out, privacy and lack of interruptions were ensured.

The tests were applied in the order indicated above, and for all participants, reassurance and clear explanation of movements or postural change was a primary consideration. The tests, and what was required of participants were fully explained and taken at a pace dictated by the individuals' responses. A mean time of 40 minutes for the whole procedure was taken for the patient group, ranging from 35 to 60 minutes. Control group volunteers were tested in interview rooms in the resource centre (20) and Clinical Psychology Department (6), and took from 15 to 40 minutes, averaging 25. All participants successfully completed the range of tests: although testing instructions included repetitions of certain test movements, these were not carried out in cases where the participant demonstrated almost immediate loss of balance. No participants withdrew once tests had commenced, and none expressed experiencing aversive responses.

2.6 Independent Raters

To provide a check on testing procedures, clinicians familiar with the study and the testing methods acted as independent scorers for the tests. A Senior Occupational Therapist, a Senior Community Mental Health Nurse and a Psychologist rated a random selection of tests, to ensure both that procedures were followed as prescribed, that those participating in the tests were not experiencing discomfort or distress, and that test scores from the independent rater and the researcher agreed.

The only variations which occurred between the researcher and independent raters' scoring were cases where raters scored participants 1 point higher than the researchers on varying reflex scores: one explanation for this could lie in the researcher's attempts to score responses stringently, in order to avoid inaccurate or inflated scores. However, review of completed patients' score sheets from raters and researcher showed agreement across 39 of 48 items (81 per cent), and 25 to 30 items (83 per cent) from the controls' test scores.

2.7 Statistical Power

Over the years, in previous studies investigating presence of aberrant reflexes or central nervous deficits in anxious patients, sample sizes have ranged from 8 to 2000. The use of a control group is not reported as standard practice, other than in one study

of 18 patients with panic or agoraphobic. There were therefore no consistent data on sample sizes or power relevant to this study.

In order for power to reach 0.8, $\alpha = 0.05$, and what Cohen refers to as a large effect size, $N = 25$ would be needed in each group for a test of difference between the two sets of participants (1988). However, a non-parametric test was required, but the power of a Mann-Whitney test for the same data is likely to be just as great (also for power = 0.8, $\alpha = 0.05$, and a large effect size). In this case, 26 participants were needed for each group to test the difference between the two means.

CHAPTER THREE: RESULTS

3.1 EXPLORATION OF DATA

Demographic and test –related data were analysed using the Statistical Package for the Social Sciences (SPSS). The results section will initially briefly reiterate the demographic data, reported fully in the methodology section above. Following this, the I.N.P.P. test scores from both groups, and other factors within the findings, will be explored.

3.1.2. Demographic data

There were 10 males and 16 females in both groups. As illustrated in the methodology section, the data from the distribution of ages in the patient and control groups were analysed for normality. Skewness and kurtosis were found to be within normal bounds. A comparison of the two groups' ages also showed no significant difference ($t(50) = 6.69, p = 1.000$). The details are shown in Table 2.2, above, and in figure 6, in appendix 6.

3.2 Hypothesis- Related Data

Hypothesis 1: Application of I.N.P.P. reflex tests will result in a difference between the scores from a group of patients with anxiety disorders and a group of non-anxious controls: patient participants will achieve higher scores, indicating presence of retained primitive, or undeveloped postural reflexes.

A Mann-Whitney was performed on the mean test scores from each group, and results revealed a significant difference between the I.N.P.P. reflex test scores ($z = 5.875, p < 0.01$). Patients' scores on all reflex tests were higher than non-anxious

controls, supporting the hypothesis, and suggesting the presence of primitive and undeveloped postural reflexes in this group. The pattern of the groups' scores from each test is illustrated in figure 1 (page 86), details of the scores in Tables 3.1, and 3.2, and results from Mann Whitney analysis are in table 3.3 (page 87), below.

Table 3. 1: Scores from individual reflex tests: Patients

Test	Minimum	Maximum	Mean
ATNR	0	4	1.04
TLR	0	4	2.08
PALM	0	3	.35
OHR	0	3	.85
LHR	0	4	1.73
MS	0	3	.73

Table 3. 2: Scores from individual reflex tests: Controls

Test	Minimum	Maximum	Mean
ATNR	0	1	.12
TLR	0	2	.73
PALM	0	0	.00
OHR	0	1	.38
LHR	0	2	.69
MS	0	0	.00

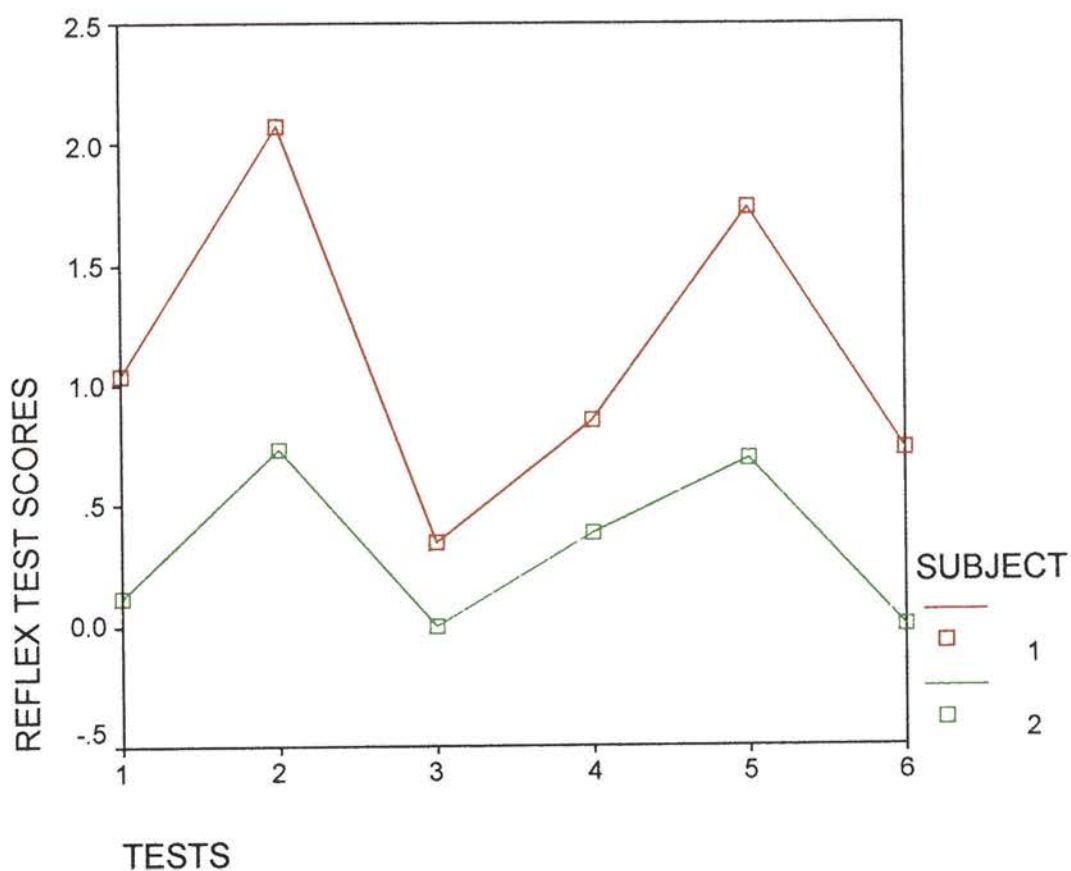
Key to reflexes tested

ATNR=Asymmetrical Tonic Neck OHR = Oculo-headrighting

TLR = Tonic Labyrinthine Neck LHR= Labyrinthine Headrighting

PALM = Palmar **MS = Moro Standard**

**FIGURE 1: PLOT OF COMPARISON OF SCORES FROM ALL SIX REFLEX TESTS:
PATIENTS AND CONTROLS**



KEY

SUBJECT 1 = PATIENTS

SUBJECT 2 = CONTROLS

Tests

- 1 = Asymmetrical Tonic Neck Reflex
- 2 = Tonic Labyrinthine Neck Reflex
- 3 = Palmar Reflex
- 4 = Oculo head-righting Reflex
- 5 = Labyrinthine Head-righting Reflex
- 6 = Moro Standard Reflex

Table 3. 3: Results from Mann Whitney analysis of comparison between patient and control groups' scores:

Reflex	Mann Whitney results
Asymmetrical Tonic Neck	$z = 4.253, p < 0.001$
Tonic Labyrinthine	$z = 4.370, p < 0.001$
Palmar	$z = 2.575, p < 0.01$
Oculo-headrighting	$z = 2.268, p < 0.05$
Labyrinthine Headrighting	$z = 4.222, p < 0.001$
Moro	$z = 4.082, p < 0.001$

3.2.1 Exploration of scores from individual tests

These data were explored to distinguish the pattern of scoring across the six tests.

From an ANOVA, and inspection of the plot in figure 1, descriptive statistics revealed that mean scores from two tests, the Tonic Labyrinthine reflex and the Labyrinthine Head-righting reflex, were highest in both group.

The ANOVA also revealed that the factor “ tests” was also found to be significant ($F(5, 250) = 26.57, p < 0.001$), as was the interaction between tests and subjects ($F(5, 20) = 3.96, p < 0.001$). These results suggested that the significant differences between patients' and controls' results for each individual test may not be constant across these. These results also justified testing the means from each test separately.

This was carried out using a Mann Whitney non-parametric test, and, to obtain confidence levels for any significance this was followed by application of an independent samples *t*-test. The differences between scores for each group from the individual tests were significant, Wilks' Lambda (.659, $p < 0.001$) confirming these findings.

The results from these procedures for each of the reflex tests are in Table 3.3 (page 87, above) and 3.4, below, while the ANOVA plot in figure 1 (page 86) confirms the scoring pattern presented in the tables, and represented in the results.

Table 3. 4: Mean scores from patients and control group individual reflex tests and results from *t*-test of comparisons

Reflex	Mean	Standard Deviation	<i>t</i> -test Result	95 % Confidence Interval of the Difference
<u>Asymmetrical Tonic Neck</u>				
Patients	1.04	1.04		
Controls	.12	.33	$t(50) = .4.324, p < 0.001$	Lower: .49 Upper:1.35
<u>Tonic Labyrinthine</u>				
Patients	2.08	1.16		
Controls	.73	.60	$t(50) = 5.236, p < 0.01$	Lower: .83 Upper:1.86
<u>Palmar</u>				
Patients	.35	.75		
Controls	.00	.00	$t(50) = 2.368, p < 0.05$	Lower: 5.27 Upper:64
<u>Oculo-headrighting</u>				
Patients	.85	.78		
Controls	.38	.50	$t(50) = 9.59, p < 0.01$	Lower: 9.60 Upper:.83
<u>Labyrinthine Headrighting</u>				
Patients	1.73	.87		
Controls	.69	.62	$t(50) = 4.596, p < 0.001$	Lower: .62 Upper:1.46
<u>Moro Standard</u>				
Patients	.73	.87		
Controls	.00	.00	$t(50) = 4.261, p < 0.001$	Lower: .39 Upper:1.08

3.2.2 Hypothesis 2: There will be a positive correlation between patients' age of onset of anxiety and reflex test scores

Details of age of onset as self-reported are shown in Table 3.5, below. When the Pearson correlation was used to analyse the means from the age of onset of anxiety variable and the reflex tests, the result showed a small relationship, which did not reach significance ($r = .304$; $n = 26$, $p < 0.131$). These results are represented in figure 2, (page 91). The hypothesized relationship between age of onset of anxiety and reflex test scores was therefore unsupported. However, when the data for self-reported age of onset of anxiety and BAI scores (Table 3.6, page 90 below) were analysed using a Pearson correlation, this was significant ($r = .446$, $n = 26$, $p < 0.05$), as shown in figure 3 (page 92).

Therefore, while there was no relationship between reported age at which anxiety was first experienced and reflex test scores, a relationship between age of anxiety onset and anxiety measure scores was found.

Table 3.5: Patients' ages at onset of anxiety by self-report

Minimum	2
Maximum	54
Mean	26.7
Standard Deviation	14.52

Table 3.6: Beck Anxiety Inventory scores (BAI)

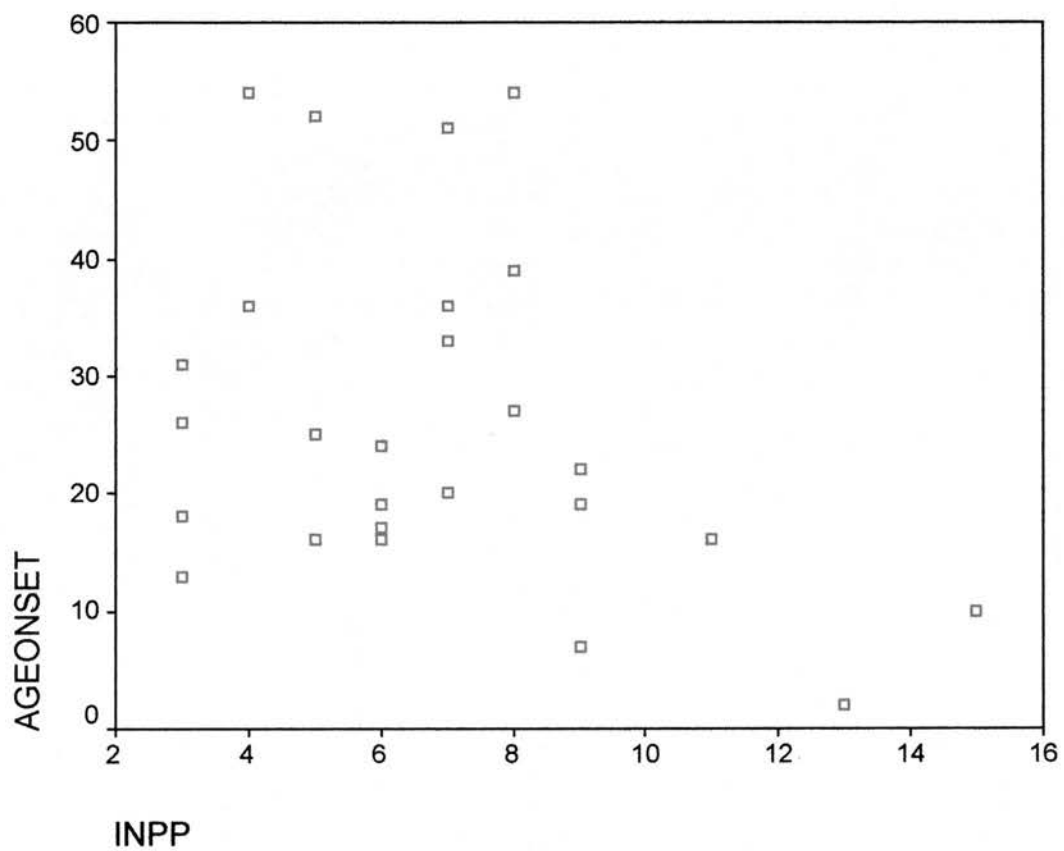
BAI	CONTROLS	PATIENTS
Minimum	0	19
Maximum	8	49
Mean	2.96	33.12
Standard Deviation	2.72	10.86

3.3 Measures of anxiety and reflex test scores

Further analysis of data was carried out to detect any correlation between anxiety measure scores, shown in table 3.6, and reflex test scores. A Pearson correlation showed that BAI and test scores were positively correlated within the whole group, ($r = .758$; $n = 52$, $p < 0.01$) demonstrated in figure 4, (page 93).

When the Pearson correlation test was applied to scores from patients' BAI and I.N.P.P. tests, only a small relationship, which did not reach significance, was found for these factors within this group ($r = .303$, $n = 26$, $p < .133$). This is represented in figure 5 (page 94).

FIGURE 2 : CORRELATION SCATTERPLOT; AGE OF ONSET OF ANXIETY AND MEAN REFLEX TEST SCORES: PATIENTS

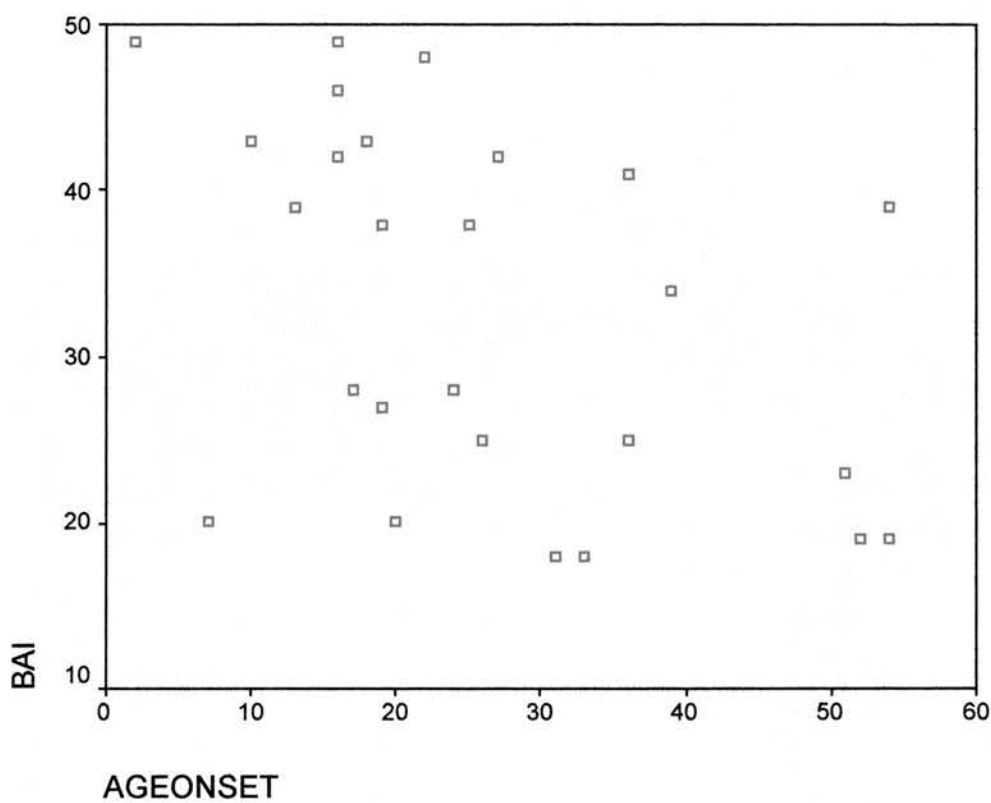


KEY

AGEONSET = AGE AT ANXIETY FIRST EXPERIENCED

INPP = MEAN SCORES FROM THE SIX REFLEX TESTS

FIGURE 3: CORRELATION SCATTERPLOT: ANXIETY MEASURE SCORES AND AGE OF ONSET OF ANXIETY

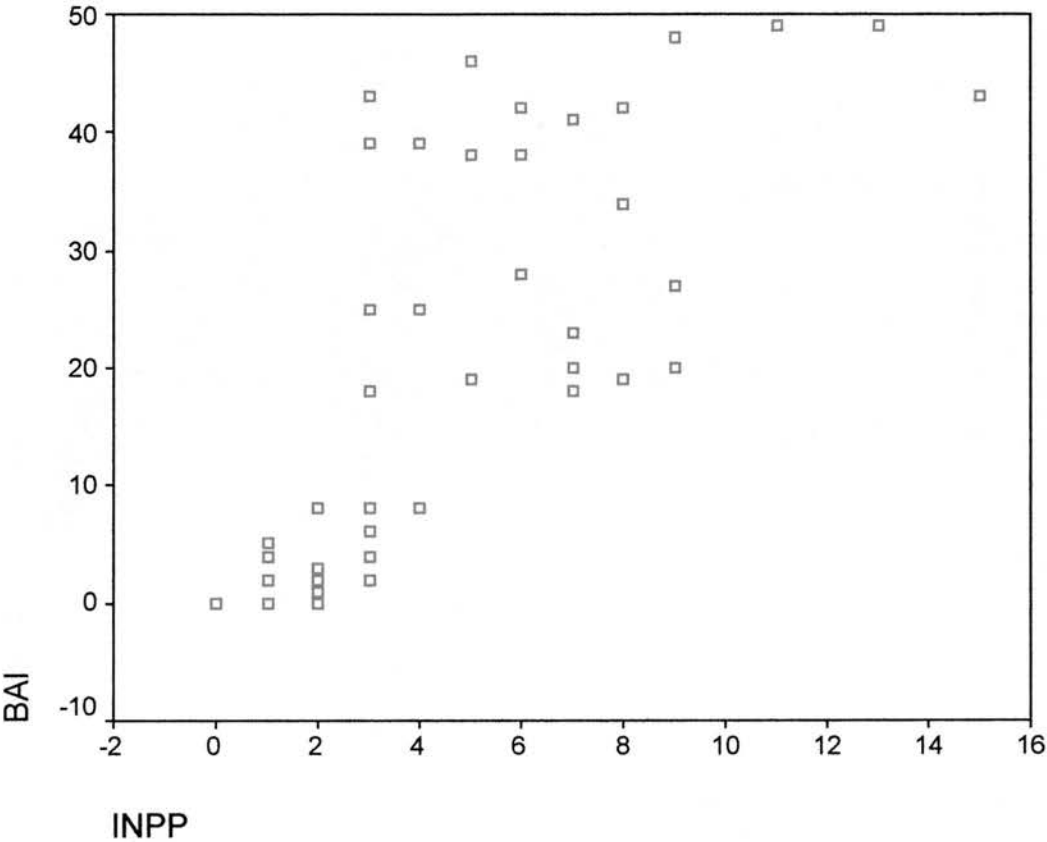


KEY

BAI = MEAN SCORES FROM BECK ANXIETY INVENTORY

AGEONSET = AGE AT WHICH ANXIETY FIRST EXPERIENCED

FIGURE 4 : CORRELATION SCATTERPLOT : INPP REFLEX TEST SCORES AND BAI SCORES : PATIENTS AND CONTROLS

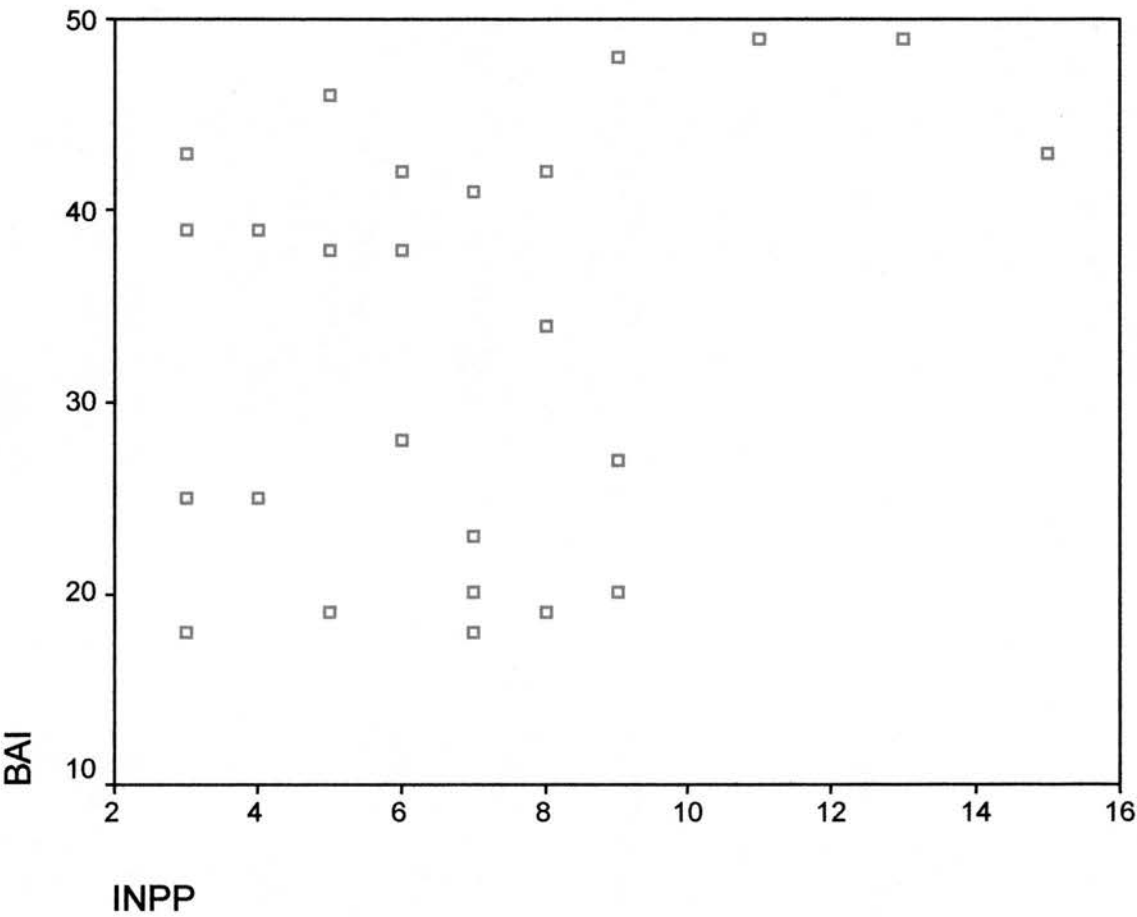


KEY

INPP=MEAN REFLEX TEST SCORES

BAI=MEAN SCORES ON THE BECK ANXIETY INVENTORY

FIGURE 5 : CORRELATION SCATTER PLOT : INPP REFLEX TEST SCORES AND BAI SCORES: PATIENTS



KEY

INPP=MEAN REFLEX TEST SCORES

BAI=MEAN SCORES ON THE BECK ANXIETY INVENTORY

3.3.2 Summary of Results

A significant difference was found between the reflex test means scores from patients with anxiety and control participants. The main hypothesis was therefore supported.

Exploration of the test scores and the resulting plot found that two of the reflex tests, those detecting the TLR and deficits in the LHR, resulted in the highest scores.

Although this was carried out to identify whether any reflexes would feature more frequently among patients, scores from the control group followed a similar, discernible pattern, as shown in figure 1. Results of non-parametric and parametric tests of means between the two highest-scoring tests for both groups, the Tonic Labyrinthine reflex and the Labyrinthine Head-righting reflex, were highly significant, at $p < 0.001$.

No relationships were found between scores from patients' BAI and reflex test measures, and between age of onset and reflex tests scores, therefore the second, null hypothesis could not be rejected. However, there was evidence of a correlation between BAI and age of onset of anxiety.

Possible reasons and implications from these findings will be discussed in the next section.

CHAPTER FOUR: DISCUSSION

4.1 Summary: earlier research and findings from this study.

A relationship between anxiety disorders and physiological problems has been cited for over two centuries, although definitions have changed (Rachman, 1998). Early biological theories were based on observations, while later, research-based methods have been applied to the detection of any “biogenic” basis for anxiety (e.g. Blythe and McGlown, 1979; 1982). Sample sizes have varied for the more recent studies, ranging from reflex tests of eight participants to analysis of over a hundred questionnaires designed to elicit responses about sensory problems.

The above efforts have all been aimed at detecting the presence of retained primitive reflexes or lack of fully developed postural ones, indicating failed development of adult responses. Where this has occurred, these reflexes are regarded as exerting an influence over sensory processing, to the extent that the individual’s relationship with gravity cannot function adaptively. A variety of problems result, and include dysfunction of balance, co-ordination and proprioception, all governed by the central nervous system.

This lack of progress from primitive neural processing to adult capabilities is termed neurodevelopmental delay, and has been seen as implicated in learning and behavioural problems, such as dyslexia and dyspraxia. Treatments evolving from the establishment of the role of sensory processing deficits in these childhood disorders increasingly feature not only in clinical and scientific journals, but also in press

reports, as being offered by a range of agencies (Bedell, 2002). Furthermore, results from studies of adults suggest that lack of maturity in some neural systems is responsible for disorders such as panic and agoraphobia in a large number of cases (Blythe & McGlown, 1979,1982). Certainly, physiological symptoms, such as the involuntary responses modulated by the autonomic nervous system, are reported by sufferers of anxiety as are fears of being overwhelmed by events, and difficulty in focusing attention (Mathews, May, Mogg and Eysenck, 1990).

Attempts to “unpack” the features of anxiety are complicated by the range of associated issues, including comorbidity, range of classified sub-types, and the overlap of symptoms which can occur in different anxiety disorders. However, results of study of patients with panic and agoraphobia suggest that problems with primitive or undeveloped reflexes feature in the majority of these. Drawing on the neuro-psychological findings and analysis, this study aimed to investigate any presence of such reflex dysfunctions in a population of patients with generalized anxiety disorder, in order to provide preliminary findings regarding the possibility of their influence in varying sub-types.

Although there were no significant relationships found between patients’ age of onset, reflex test and anxiety measure scores, analysis of comparison of means from the reflex tests showed a significant difference between the anxious patient group’s

higher scores and those from the non-anxious controls. Possible reasons for the significant and non-significant findings will be discussed, as will implications and ideas for further study.

4.2 Discussion of research findings

4.2.1 Hypothesis 1

Research based on the work of the I.N.P.P. reports evidence of retention of the Asymmetrical Tonic Neck reflex, Tonic Labyrinthine reflexes, and lack of fully developed head-righting reflexes in anxiety disorders. In one study employing audiological and neurological tests, an “abnormally high” number of patients with panic had anomalous vestibular and audiological functions, findings which were seen as recommending further study (Rolf, Moller, Turner & Wall, 1985). Results from this current study produced hypothesised significant differences between anxious and non-anxious adults’ reflex tests, with two tests, the Tonic Labyrinthine (TLR) and Labyrinthine Head-righting (LHR) reflex tests scoring higher than others in both sets of participants, but again significantly higher in the patients.

Both of these reflexes are influenced by labyrinthine processes: the TLR, if not inhibited, delays the transformation into the adult head-righting, balance, oculomotor and visual-perceptual abilities. The LHR, as a head-righting reflex, is necessary for maintenance of balance.

According to I.N.P.P. literature, where the TLR and other reflexes are retained or underdeveloped, there will be labyrinthine-vestibular difficulties. As structures in these two systems control balance through interpretation of sensory environmental cues, dysfunctions here will cause problems in relating to gravity and adapting to related changes. Aberration in the LHR alone gives rise to resultant balance problems, with secondary physiological, emotional and cognitive responses to experience of gravitational insecurity. If problems exist with another labyrinthine reflex also, then adjustment to altering sensory demands is even more disturbed.

Examples of the effects of these is found in the definitions of “subjective vertigo”, where the stationary person perceives themselves as moving while their environment is not, and “objective vertigo” where this is reversed (Wolfson, Marlow, Silverstein & Keels, 1981, in Blythe, 1999). This demonstrates problems in the vestibulo-ocular arc, and the link between balance control and visual difficulties. If the former is compromised, then recourse to the use of the eyes to establish where the person is in the environmental space is understandable. However, if visual-perceptual processing is also adversely affected, then deciphering and selecting sensory cues necessary to maintain equilibrium will be extremely difficult. This would also explain the unpleasant experiences of dizziness reported as accompanying different types of anxiety.

The dizziness which accompanies disturbance of balance is cited in many studies of an association between vestibular dysfunction and panic (Asmundsen, Larsen & Stein, 1998). A significant correlation has been found between this neurological problem and psychiatric morbidity, which includes anxiety (Eagger, Luxon, Davies, Coelho & Ron, 1992). Asmundsen et al.(1998) also reported increased anxiety in movement- related situations, particularly those involving visual fixation or head-turning. Anxious responses were even more evident where the sensory demands were complex, such as walking through supermarket aisles while checking surrounding shelves, both actions which demand vestibular and visual processing.

Although investigations into the alignment between neurological dysfunction and anxiety disorders have focused mainly on panic and agoraphobia, there are features of these which are common to other types of anxiety. For example, the muscular tension, hyperarousal, anticipatory fear and autonomic components of these found in generalized anxiety disorder are also common to other types of anxiety (Barlow, 1988). The autonomic nervous system acts in processing and interpreting sensory information and influencing physical responses, including changes in breathing, heart rate and any gastric or urinary activity, while the effects of Adrenaline, as part of a “fight or flight” protective reaction to sensory overload, increase these. If the situation is overwhelming, then the failure to integrate the information and keep control results in an anxiety response.

However, the anxious patients' group in the current study achieved varying scores on the reflex tests, highlighting a point raised by Blythe in the discussion of agoraphobia as a neurologically-based problem (1999). Blythe admits that, if, 75 per cent of agoraphobes in I.N.P.P. research displayed primitive or untransformed reflexes, then the source of the remaining participants' problems must lie in "emotional" or other areas of disturbance (Blythe, 1999). Furthermore, reliance on a neurological explanation, attributing the major causal role of anxiety disorders to presence of aberrant reflexes, risks being regarded as reductionist. Although primitive and untransformed reflexes have been identified in cases of anxiety disorder by I.N.P.P. research and in this current study, the presence of these does not explain the variance in anxiety disorders and degrees of these, or associated responses.

There is evidence to suggest that the range of individual's circumstances, experiences and attributional style cannot be discounted as an influence on development of anxiety. For example, Endler, Flett, Macrodimitris, Corace & Kocovski (2002) identified separation and negative self evaluation as predictive of anxiety, suggesting the interactional nature of the development of anxiety disorders. These findings also support those of Hudson & Rapee (2001), who stressed the transactional nature of parent-child relationships, particularly where parenting style was of an anxious nature, and how this was related to development of anxiety disorders in children.

Further evidence of the interactional nature of anxiety as identified in the Endler et al. study (2002). Proposing that interpersonal and social aspects should be included in trait anxiety concepts, Endler et al. stated that social evaluation, separation from significant others and self-disclosure anxiety scales had “strong psychometric properties”, and that they identified aspects of trait anxiety. Social anxiety was an important trait, involving features including self-concealment, anxiety sensitivity and worry.

The latter illustrate some of the experiences which may be associated with the emotional aspects of anxiety, particularly in a social context. For example, although deficits in reflexes may lead to deficits in processing information and resulting dizziness, fear of a social display of faltering or clumsiness could contribute to the anxiety, increasing both the emotional response and inability to cope. Avoidance of social contact would be an unfortunate sequel to an experience such as the above, especially as perceived stress of social interactions may progress to further exclusion. Perceived failure and accompanying emotional and cognitive responses may also feature in development of a schema for failure (Young & Klosko, 1994), further compounding coping abilities and increasing anxiety.

Again, although dizziness and inability to deal with environmental information might be attributed to aberrant reflexes and sensory processing deficits, demands of

processing external stimuli may lead to “overload” in cognitive systems, where the person is also attempting to co-ordinate behaviour. In anxiety, the stress of assimilating attentional demands, resultant perceptions and corresponding physical responses will compromise efforts to cope.

In research on Generalized Anxiety Disorder (G.A.D.), where perceptions of events are frequently stressful and preoccupying, results also supported the diagnostic classification of worry as a cardinal feature of this anxiety sub-type (DSM-IV, American Psychiatric Association, 1994): Constans, Barbee, Townsend & Leffler, (2002) found that, although intensity and frequency of worries in patients with G.A.D. diminished over twelve months, original worries were sustained, and new ones replaced the previous, relinquished ones.

The findings that specific perceptual, transactional and coping styles are related to anxiety lend support to personality, trait and cognitive theories of anxiety: however, Endler et al. (2002) postulate that the nature of the development of anxiety is interactional. Bearing in mind findings that only 50 to 60 per cent of patients benefit from psychological treatment (Fisher & Durham, 1999), the current study investigated the characteristics of reflexes in anxious adult patients in comparison to non-anxious adults, in attempts to identify one aspect of anxiety which may be overlooked, and which may contribute to explanation for cases of treatment resistance.

In addition, Barlow (1988) highlights the autonomic components of anxiety, involving neurological and hormonal processes: these include the release of adrenaline stimulating an increase in involuntary cardiovascular, respiratory and muscular responses, and identified as physiological symptoms which “correlate highly” with “morbid anxiety” (Tyrer, 1976).

Biological factors are therefore accorded a role in the complex evolution of anxiety disorders, but, as Endler et al. (2002), Constans et al. (2002) and Hudson & Rapee (2001) postulate, the genesis and maintenance of anxiety is multifactorial and interactional. Neurological deficits affecting information processing may be present, and of no concern unless challenged by contextual changes or demands (Goddard, 1996). For example, for some patients suffering from anxiety, identification of environmental challenges and the enhancement of cognitive skills in coping with social stress may be the most important area. However, the interplay of personal, interpersonal, environmental and historical factors involved in anxiety is outlined by Yapko (1994) in the multidimensional model. Rather than adopting a position where neurological deficits are expounded as a complete explanation of the development of anxiety, the biological characteristics of reflex problems in anxiety suggested by the results of the current study are offered as another possible factor in the interactional and multidimensional perspective of the development of anxiety.

In the earlier studies of agoraphobia and panic (Blythe & McGlown, 1979;1982) participants were not specified as patients, and no indication of severity or duration of disorder was indicated. Consequently, patients with generalised anxiety disorder (G.A.D.) were referred to the current study as a method of addressing problems with clarification of the nature of participants' anxiety in previous research. Referrals were sought from practitioners in psychiatric and psychological services, with whom individuals with diagnoses of anxiety were in treatment.

The study's findings of aberrant reflexes in this group of patients with G.A.D. suggest that these may be found not only in panic and agoraphobia, but also in other types of anxiety disorder, and the results were statistically significant. In order to address the question of clinical significance, however, it would be necessary to test for presence of reflexes before and after application of I.N.P.P. treatment methods.

4.2. 2 Hypothesis 2

Age of onset was not found to correlate significantly with reflex test scores. Possible reasons for this could lie in accuracy of participants' recall, or confusion over time of diagnosis. In addition, a larger sample size may have produced different results.

It may have been difficult for patients to specify when they first experienced anxiety: some reported that their parents had told them they had always been "nervous" children, or had otherwise recognised anxiety in their child in infancy. Others could

relate first occurrence of anxiety-related experiences to particular primary school stages. It is difficult to assess whether the earliest reported onset, at two years, was the observation of earliest fears by an anxious parent, or the “clinging” of separation anxiety, which might progress to adult anxiety.

In addition, while some patients were clear about time of diagnosis of their anxiety, others could not be specific, especially if there had been episodes of treatment by a General Practitioner, then improvement, followed by relapse and referral to mental health services. Attempts were made to calculate the time scales involved in these events from the respondents’ histories, but these may not have been completely accurate. In order to clarify date of diagnosis and duration, procedures such as inspection of patients’ general practice and psychiatric service casefiles would have to be carried out, and this was not within the scope of this study.

One of the major difficulties in testing this hypothesis therefore lay in the problem with validity and reliability of deriving measures of age of onset from patients’ subjective reports. This issue would need to be addressed in any future attempts to design a study including duration of anxiety as a variable.

However, the procedures adopted in the collation of this data follow those which constitute psychological and psychiatric history-taking, and, to this extent, relies on

this method as a basis for gathering information from the patient's report of their situation in everyday clinical practice.

On the other hand, the findings from testing the second hypothesis might not have been unexpected. If primitive reflexes are retained due to trauma or deprivation before, during or in early days or months after birth, the damage to the sensory system occurs during any of these periods, but prevents development of adaptation from the start of life. Only in cases of trauma to the adult central nervous system, such as in brain or spinal injury, or degenerative disease, can a fully transformed, adaptive response revert to primitive status. In other words, the aberrant reflex can be in situ since before birth and throughout life, while a fully developed mature sensory processing response cannot become primitive without assault to the central nervous system. However, primitive and undeveloped postural reflexes can exist without causing any problems in activities of daily life, until a challenge arises.

For a child this challenge could be the transition from activities of life at home, to first experience of school. Here, stimuli of noise and motion, and the need to adjust to learning to read and write, all make demands on the filtering system which copes with the escalation in auditory and visual material, and the required change in motor skills. If overwhelmed, the child can withdraw: this is an example of effects of a retained reflex, the Moro, where the sensory systems have to "juggle" information from their world to decipher this and determine what response is expected. In

deciding to deal with either verbal, visual, or any other stimuli, the withdrawal aspect of the retained Moro leads to elimination of speech, termed “elective mutism”, often displayed only when at school (Goddard, 1996).

In adults with anxiety, the triggering event could be seen as similar to the cognitive concept of the critical incident. In the neuro-physiological and psychological model, the incident would precipitate fearful thoughts and accompanying self-talk, but in the person with the retained primitive or undeveloped postural reflex, the fearful situation also produces overload of stimuli, activating a brain-stem, reflex action, rather than accessing cortical, reasoning abilities. The outcome is panic, due to failure to co-ordinate and cope with the sensory information. The ability to interpret the event, the thoughts and emotions is overruled by the neurological deficits.

Just as entry to school requires adjustment, so a change in environmental demands can exceed adult sensory processing capacity, where a primitive reflex is found. The example of encountering a busy, crowded hall to deliver a speech for the first time can be applied to the neuro-psychological explanation of an anxious response. In the case of the retention of the Tonic Labyrinthine Reflex, found to be prevalent among the study patient group, not only balance is affected, but the co-ordination of visual and motor functioning, and discriminatory attentional abilities are compromised. These features would manifest themselves in the inability to focus visually, or discriminate between visual cues, such as layout behind or on stage, the audience or

any written notes; dizziness and muscular tension; focus on perceived threat of audience scrutiny and judgement, and perhaps freezing, to avoid the threat. This experience might prompt consultation with a medical practitioner, and a diagnosis of social phobia.

In the above example, the anxiety disorder has not presented any problems in coping with life until a precipitating event. Returning to the case for causes other than biological, as Endler et al. (2002) suggest, separation and interactional processes as strongly predictive of anxiety responses: although these could be seen as an influential life events, this could also represent the occurrence of a precipitant to a congenital, neurologically-based reaction. The type and severity of reaction to this, however, is influenced by the underlying residual or fully retained reflex, which has existed in this form since birth, or possibly before. This phenomenon could offer another explanation of the lack of significant relationship between age of onset of anxiety and reflex scores. Moreover, the criticism of the methods of gathering data on age of onset reflect the problems in testing this hypothesis.

4.2.3 Related findings

Although there was no significant relationship between reflex test and anxiety measure scores, a correlation between the latter and age of onset was found. Reasons for these findings could lie in the choice of anxiety measure, to be discussed later.

Other possible explanations are outlined in the BAI manual. In developing the measures, it was found that women reported anxiety more frequently than men, and that women's scores may be up to 4 points higher. In the study's patient group, 16 were female, therefore this may have produced an inverse relationship between the measures of the patients' anxiety and their ages of first experiencing this. However, the average BAI score for females was 33.62, and 32.5 for men, and comparison of the BAI scores by sex revealed no significant difference. The distribution of sex did not appear to explain the relationship between age of onset and BAI scores.

Another explanation from the BAI manual concerns the statement that younger patients report anxiety more often than older patients. "Younger age" is not specified in the material, but the mean age from the sample used in the development of the BAI is given as 34.9, while the mean age among patients in this study was 41.9, with 13 participants below the age of 44 years. However, prevalence of anxiety disorders by age has been estimated as 47 years by the World Health Organization (2000), and, from Primary Care data, as occurring most frequently between ages of 25 to 44 years. This is also the population who consult their G.P. most frequently about their anxiety. This group therefore recognises symptoms, regards them as serious enough to seek help, and acts on this. As a group who present their symptoms to clinicians voluntarily, individuals within the 25 to 44 years age set could be likely to self-report their perceptions of the neurophysiological, subjective, panic and autonomic symptoms at significant levels on an anxiety measure designed to elicit

these. The mean age of the patient participants, at 41.9, is less than the W.H.O. estimate, but falls within that given by National Health Service demographic data. This could account for the relationship between the age of onset and BAI scores, as reflecting the perceived and experienced anxiety of patients drawn from a population with an age range similar to that recorded in the demographic data. In order to substantiate this claim, however, it would be necessary to specifically investigate whether there is a direct relationship between ages and BAI scores among different types of anxiety.

4.3 Further Explanation of Findings

4.3.1 Research design and selection of subjects

The between- groups design was chosen to provide comparison between anxious and non-anxious samples. However, the patient group were tested in the knowledge that they were people with a diagnosis of anxiety, rather than “blind” testing of participants randomly selected from a mixed sample. This could be regarded as potential source of researcher bias when assessing responses to the individual reflex tests.

Although the random and blind selection of participants would ensure that scores were obtained without influence of knowledge about presence of the disorder, this was not possible in this study. Also, to avoid researcher bias, independent raters were used for a sub-sample from each group, and communication with the I.N.N.P was

established throughout the project. The aim was to provide preliminary findings of whether aberrant reflexes were more prevalent in individuals diagnosed as anxious, therefore identification of patients was the most direct route to the comparison. This was also carried out as a method of addressing the problems of previous studies regarding lack of information about the characteristics of participants' anxiety. In addition, before the two groups could be matched, it was necessary to obtain details of sex and age, before approaching control participants. These were matched exactly for sex, and identical, or within a four-year banding for ages.

The above were the concerns for the design and enrolment of participants in this study: nevertheless, it would be interesting to obtain results from future research into primitive reflexes and anxiety from application of blind testing methods.

4.3.2 Measures

The B.A.I. was selected for the following reasons: ease of use, therefore likely adherence by patients; lack of overlap between measuring symptoms of anxiety and depression, and subscales based on neuro-physiological and autonomic symptoms.

A major criticism here, however, is that, as the symptoms are rated on experiences from the previous week, that measures are derived from state, not trait-based anxiety. A further criticism could be that this study measured features regarded as innate and stable, and a trait-based instrument would correspond to this more accurately than

one which captures information about fluctuating anxiety. The use of an instrument such as the State-Trait Anxiety Inventory (S.T.A.I.; Spielberger, 1983) would be preferable. On the other hand, the subscales in the B.A.I are reported by Beck and Steer as correlating significantly with those in the S.T.A.I., but not with measures of depression. It might be useful to compare STAI scores with those from reflex tests, for any relationship between these.

Although the BAI is not a direct measure of trait anxiety, the analysis of factors and comparison with other screening methods recommends this as specific to collation of ratings of anxiety, and a strong relationship with trait measures. The brevity and ease of understanding also helped in the pre-test phase of contact with participants, as non-threatening, therefore unlikely to increase anxiety levels.

4.3.3 Procedures

4.3.3.1 Setting

It was not possible to carry out anxiety measures and reflex testing of all participants in the same location. This could have introduced other variables, but these were controlled as far as possible, with participants' agreement. There was access to an appropriate surface to lie or sit upright on during tests requiring this, in all settings; extraneous noise and interruption were prevented before testing, and the same object was used throughout for visual focusing. Each participant was given an information and consent sheet before testing.

Carrying out tests in a completely controlled environment was not feasible for two reasons: in many cases, patients were unable or unwilling to be tested anywhere other than their home; also, the timescale for data collection meant that the patients were a form of opportunistic sample, in that they were referred by clinicians, and some could only be contacted and tested in the respective treatment settings. Some patients were therefore tested at home, while others were all seen in interview rooms, but in different health service locations.

In order to prevent any influence in results from location, consistency of setting would have to be ensured. Conversely, if participants were anxious about being interviewed and tested away from home, attendance at research facility might be avoided. It could also be argued that allowing patients to undergo tests in their own home was less likely to exacerbate their anxiety, and inflate BAI or test measure results. However, in any further studies, the use of one location would address the problem of any variables involved in varying this.

4.3.3.2 Raters

Efforts were made to avoid any bias in the researcher's evaluation of test responses. Independent raters were used, and scored patient and controls tests blind of the researcher's scores for 25 per cent of controls and 31 per cent of patients. Again, the raters were not consistent, as they were drawn from a group of senior mental health nurses, psychologists and occupational therapists. These co-raters were chosen as

they were familiar with the study's background and procedures, and in the case of occupational therapy staff, with neuro-physiological tests from which the INPP measures were drawn. Although, on occasions, raters scored responses higher than the researcher, there were no significant differences between both sets of scores.

For further study involving I.N.P.P. tests, raters would have to be consistent, with knowledge and training in testing methods. Again, it was not possible to achieve this within the bounds of this study, but this could be addressed in future research.

4.4 Case examples

The effects of sensory processing deficits have been described above. The use of INPP measures revealed presence of problems with particular reflexes in two cases: these illustrate effects of retention of the Moro reflex and lack of transformed head-righting reflexes, to be briefly discussed here.

4.4.1 Retained Moro reflex

This participant, a 37 year-old woman, scored 3 on the Moro test, indicating 75 per cent retention of this reflex. In spite of several opportunities, she could not move her arms from her side to clasp them across her chest when requested. She also advised the researcher that this task felt unpleasant, and made her very tense.

Her history of anxiety was recalled as onset at 12 years, but then “as long as I can remember”. She was “scared” and a worrier as a child, and throughout school and into adult years, she retained a fear of fainting and episodes of uncontrolled dizziness. She also felt that voices echoed, and currently found herself easily startled and jumping at noise. On one occasion, visiting a member of her family in a hospital room with a ceiling fan, the movement of this caused her to panic and almost pass out. Her blood pressure was measured and found to be high, and her face became very flushed.

With fears that her face would flush again, difficulty in coping with sudden noise and generalised anticipatory worry, she had currently stopped going out alone, and without the intervention of her clinician, an occupational therapist, was in danger of becoming housebound and agoraphobic.

4.4.2 Undeveloped Head-righting reflexes

This 36 year-old man said that he had never seen himself as anxious, but recalled worrying at school about academic performance, therefore driving himself to meet deadlines since then. He also said that he experienced migraines at primary school, usually on a Monday morning. His scores on the two head-righting tests were both 3, suggesting underdevelopment or absence of these postural reflexes, necessary for balance.

He felt that his anxiety had begun, or was recognised 3 years previously, and was due to work stress. This was identified when he presented at his general practitioner with symptoms occurring when he woke up: double vision in his right eye, dizziness and inability to focus when he kept his head still and moved his eyes. Currently, when outside, he experienced dizziness in particular situations, for example, when crossing the road. The minute he reached the edge of the pavement, he became unable to visually track moving cars and also maintain his balance.

In the period preceding his visit to the G.P., out of 24 days, he felt he had only slept for 16 nights. This was due to worries about work, as a bank manager, and about onset of dizziness on getting out of bed in the morning. These symptoms resulted in referral for investigation of middle-ear problems, but no abnormality was detected.

This man's problems in processing environmental information continue, to the extent that he was referred to psychology services, and retired from work. He admitted that he is unsure where and how he will work again.

4.5 Implications of findings

Although there were procedures in the study which could have been applied differently, results provided preliminary findings on a phenomenon not widely acknowledged in psychological therapies. Having investigated some shortcomings in

methods, the following is a discussion of possible further research and application of outcome from this.

4.5.1 Future research

The use of independent raters, consistency of setting and selection of measures have been discussed above. This study aimed to establish any significance of neuro-physiological factors in the origin and persistence of anxiety disorders. Many other theories have offered explanations, but associated interventions, including pharmacology and psychotherapy have not always produced consistent or long-term health gains.

There are remedial exercises available, resting on the neuro-physiological model, which inhibit each reflex in turn, in the order they develop, with corresponding movements. An intervention study, based on application of these with anxious patients would provide information on effectiveness of this approach. This could involve study of patient satisfaction, adherence rates and comparison of outcomes with other treatment methods.

An effectiveness study could be carried out in preference to an efficacy study. The latter aim to define which therapy works for which disorder. Problems with randomised control trial-based efficacy studies have been identified as being

influenced by the need for cost-effectiveness and based on effects from rigorous, manualised treatment of “uncomplicated” patients. These conditions are unusual in everyday practice, which should be the focus of research (W.H.O., 2000).

Many of the symptoms of anxiety extend across the range of these, therefore experiences of anxiety will vary between patients. Also the fact that patients are all individuals, in different contexts, means that one approach might not suit all. Just as INPP methods may not be effective in every case, outcomes from established treatments have not always been reliable. The W.H.O. asks why anxiety disorders appear to be treatable, but remain “a burden”. If INPP-based findings offer an alternative explanation of why treatments fail, then it would be valuable to investigate the potential of a related intervention. This would also increase treatment choice, based on trials with “ordinary” practitioners.

4.5.2 Use of I.N.P.P. measures

The reflex tests used by the INPP for adults have a background in neurology and physiology, and are based on knowledge of architecture of the brain and central nervous system. As Capute, Accardo, Vining, Rubenstein & Harryman (1978) point out, if there is a neurological deficit, there are signs which can be measured. This is a well-established practice among neurologists and physical therapists, who use neurological tests to identify not only deficits in physical functioning, but the area of the central nervous system or its peripheral supply which is affected (Ayres, 1987;

Bobath, 1975; Grimley & McKinlay, 1977). In addition, the reflex tests were not used as measures of anxiety, but in detecting the presence of reflexes in an anxious population, and any relationship between these and the development and experience of anxiety.

An example of the use of these measures is discussed above, where, in an out-patient paediatric mental health setting, an occupational therapist applies a range of tests including those featured in the I.N.P.P. battery: these are procedures screening for not only motor skills deficits, but also sensory processing problems in children. The detection of faulty processing of sensory information and related physical responses, as in the case examples, above, is the central feature of I.N.P.P. reflex tests.

As discussed above, different measures have been used in varying studies of psychological problems associated with anxiety. This is often comorbid with other problems, such as depression or substance or alcohol abuse: anxiety is also a feature of schizophrenia, and corresponding treatments have been developed for this population (e.g. Kingdon & Turkington, 1994).

Investigating the characteristics of primitive and undeveloped reflexes in generalised anxiety disorder, results from this study showed that not only were patients' scores significantly higher than non-anxious controls, but that labyrinthine processes were most frequently represented in the overall pattern. Previous research has reported

presence of the Asymmetrical Tonic neck reflex and Tonic Labyrinthine reflex in cases of agoraphobia. The application of INPP tests in different anxiety disorders would help identify whether any particular reflexes are specific to different anxiety subtypes.

The tests could further be employed in detection of reflex problems on patients with chronic and enduring conditions, including schizophrenia. Anxiety in this case is recorded as signalling relapse, and is as disabling for this group as for those without psychosis, if not more so. Also, Eagger, Luxor, Davies, Coelho & Ron (1992) found a significant relationship between psychiatric morbidity and vestibular symptoms therefore reflexes aligned with sensory system problems may be implicated in anxiety in this group.

In patients referred for psychological treatment, reflex measures could be incorporated into screening procedures, as part of a global assessment approach: just as cognitive, social/interpersonal and emotional factors are identified, then reflex tests are a physiological measure. It may also only be necessary to carry out less than the number of tests employed in the study (Blythe, personal communication, 2002).

Finally, in a non-clinical population, and as a preventative measure, reflex testing for children who have displayed co-ordination problems could be carried out in addition to routine screening, and in pre-school or early primary school years. This could

assist in identifying any dysfunctions which could be remedied, to avoid problems escalated by exclusion from social activities and games, due to clumsiness.

4.6 SUMMARY AND CONCLUSIONS

From review of literature on treatment choice and outcome, three main problems emerge: results from “gold standard” treatments for anxiety are often products of randomised control trials, seen by government and global health agencies as unrepresentative of everyday practice; psychological therapies declaring themselves to be effective often lead to short- term improvement, and many treatment approaches have not been evaluated. The multidimensional nature of problems, including anxiety, and the dilemma of describing therapies which also cross dimensions, complicates issues further. However, results and statements such as those outlined above, suggest that the range of experience of this disorder, and individual differences demand treatment diversity and choice.

In investigating characteristics of the patient group, no significant relationship was found between the age anxiety was estimated to have begun, and reflex test scores. This has been explained as potentially a result of presence of reflex -related difficulties before birth or due to early trauma or deprivation. However, the significantly higher scores from the tests showed not only that anxious individuals

scored higher than a non-anxious group, but that reflexes arising from problems in the labyrinthine system occurred most frequently. These results were discussed in relation to findings of vestibular disorder presenting across the dimension of psychiatric problems, from anxiety, originally classed as a neurosis, to psychotic disorders including schizophrenia.

Possible reasons for findings lay in some of the procedures applied in the study, many of which occurred due to restrictions of time and effort to enrol the sample number required for power. This was achieved, however, and the findings here could inform further studies, of populations suffering from different forms of anxiety, and those with enduring and severe mental health problems. Moreover, this could also be directed at children challenged by potential problems in educational and interpersonal settings.

This study was designed to examine underlying features of anxiety from an integrated perspective, not widely researched or represented in many psychological models. Mindful of the encouragement to erode barriers and promote dialogue between scientific and clinical research, physiological psychology would benefit study of the origin, development and real-life effects of anxiety.

CHAPTER FIVE: REFERENCES

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APPENDIX 1: INFORMATION SHEET FOR
REFERRING CLINICIANS

DETAILS OF THE RESEARCH PROJECT: A PREVALENCE STUDY OF UNINHIBITED PRIMITIVE REFLEXES IN A POPULATION OF PATIENTS WITH ANXIETY DISORDERS

Background

Anxiety disorders are among the most common mental health problems referred to clinicians, while anxiety itself can co-exist with other disorders. This is a condition, then, which can result in contact with mental health or psychological services and, possibly, pharmacological treatment. Costs of varying kinds are therefore implicated.

Attempts to further knowledge about anxiety and treatment methods continue, although gaps in this have been highlighted. For example, Price et. al (2000) note that integrated primary care and mental health models of treatment, seen as effective, have not been well- studied. Similarly, clinicians' awareness of the effects of anxiety on quality of life is seen as limited (Mendlowicz, 2000). Also, psycho-social and cognitive-behavioural approaches, although accepted as beneficial, have also been judged as failing to help all patients (Foa, 2001; Hayward et. al., 2000).

The role of medication has also been studied. In the past, prescription of benzodiazepines for anxiety was common, as access to psychological approaches was limited. More lately, tricyclic antidepressants and S.S.R.I.'s have been used. The latter are seen as "safer", but along with existing psychotherapeutic treatments, are seen as varying in their effectiveness (Velosa and Riddle, 2000).

In treating anxiety, methods which avoid, for example, the use of anxiolytics, with their associated risk of dependence, are sought. In attempting to achieve deeper understanding of anxiety, its basis and potential treatments, recent attention has turned to the possibility of the role of physiological and neurological factors. For example, one study considers the role of endocrine responses to stress, suggesting that somatic factors are associated with this, and may be implicated in the development of depression and anxiety (O'Brien et. al., 2001). Discussing the use of psychotherapy, Goldman cites properties which the amygdala exerts on major anxiety. The author also encourages collaboration between neuroscientists and psychotherapists (2000).

This move to neurophysiological considerations finds support in the work of the Institute for Neuro-Physiological Psychology (INNP): key researchers here have studied retention of primitive reflexes in children well past infancy, when these reflexes should have been inhibited. A link has been established between the presence of these and motor and learning difficulties (e.g. Goddard, 1996; 1999; 2000). In such cases, corresponding remedial exercises specific to the retained reflex are reported by parents as resulting in improvement (Noel, 1999).

Other findings from the INNP highlight the involvement of vestibular problems, which directly affect balance: sufferers of anxiety frequently cite symptoms of dizziness and inability to process information about their surroundings. The dysfunction in this mechanism is explained as resulting from persistence of an infantile reflex, as seen in the Fear Paralysis response, where an individual "freezes": the idea posited is that, in cases such as these, a strongly retained reflex, the Moro, or "startle" reflex is present (Cottrell, 1987; Bennett, 1988). The Central Nervous System is therefore implicated in influencing panic and anxiety reactions.

Continued over/

Aims of the study

The above findings identify an interaction between neurophysiological features and their role in anxiety. Based on these, and studies of treatments which fail to achieve optimum results, this project aims to investigate the presence of retained primitive or undeveloped postural reflexes in a population of adults diagnosed as having anxiety disorders.

Participants

Adult patients of mental health and psychological services in Tayside will be invited to participate in the study. Clinicians already in contact with this population will be approached for help in identifying individuals suffering from anxiety, who may be willing to take part. Invitation will be by means of initial clinician contact, followed by information and consent forms. It is aimed to recruit 26 participants by these means. The comparison group will be 26 healthy, non-anxious adult volunteers.

Method

Assessment of presence of aberrant reflexes will be carried out based on standardised tests developed by the I.N.P.P. These involve non-invasive and non-strenuous movements, including slight head-turning or tilting, arm elevation and focusing on an object at eye level, then recalling the position of this with eyes closed. The tests, to be carried out at the patient's pace and with attention to levels of comfort, will be carried out by the researcher, who is a qualified general and psychiatric nurse. Inter-rater reliability will be established through checks by an independent clinician, to ensure adherence to the procedures during samples of the assessments. The assessment should take no longer than an hour, and will be carried out in locations where the patients normally have contact with their responsible professional, for example, interview rooms in clinical departments, or G.P. rooms.

Results

Results will be analysed for evidence of any prevalence of uninhibited primitive reflexes in the patient participants' group, in comparison to the non-anxious group. The resulting information will be discussed in terms of implications for existing and potential treatment approaches.

Thank you for reading this information.

Diane S. Forrest

Clinical Psychology Trainee
Clinical Psychology Department,
Murray Royal Hospital,
Perth.

APPENDIX 2: INFORMATION SHEET FOR PATIENTS

TAYSIDE AREA CLINICAL PSYCHOLOGY DEPARTMENT

Your ref:
Our ref:
Enquiries to extension 2383

Murray Royal Hospital
PERTH PH2 7BH
Telephone 01738 621151
Fax 01738 440341

PATIENT INFORMATION SHEET

Presence of Uninhibited Primitive Reflexes in People with Anxiety Disorders

I would be grateful if you would consider participating in this study. This sheet is to provide you with information. Please read it, and ask any questions you may have. You can also contact me at the above number, should you wish any further information.

Patients who are receiving treatment for anxiety from a health professional are being asked to participate.

Why is this research being carried out? Anxiety is one of the commonest problems seen by mental health and other professionals, and can cause distress and disruption to quality of life. There are various treatments currently used to try to help reduce sufferer's anxiety, including medication and "talking" treatments. However, sometimes these are not as successful as hoped for, or they do not achieve long-lasting effects. Research such as this is carried out because of these concerns, and also the need to understand more about the nature of anxiety.

What will I be asked to do? You will continue to receive treatment as usual. If you agree to take part, you will be asked to attend an assessment session, which will last no longer than your usual session with the health professional you usually see, or no longer than one hour.

What is involved? During this session, you will be asked to carry out small, non-strenuous movements, such as changing posture, turning your head or holding out your arms. Some of these movements will be carried out while sitting, a few while standing, but none last more than two minutes.

Are there any risks? The movements are not demanding, and will be fully explained and taken completely at your pace. Importance will be given to your comfort during the session, and you will be guided through the movements by the researcher. Your G.P. will also be informed of your participation.

What are my rights? I would be very grateful for your help with this project, but if you decide for any reason that you do not wish to participate, this will not make any difference to the treatment or services you already receive. Also, if you decide to take part, but later change your mind, this will not affect your contact with services either.

Will anyone know that I was involved in this study? Information from the assessments will be coded, and no names will be used, so none of the material gathered will be identifiable. The process of gathering and examining information will follow the Data Protection Act requirements. Your G.P. will be informed of your participation, and you can request a copy of the results of the study if you wish. Tayside Committee for Medical Ethics is responsible for examining proposals for intended research involving patients, and has allowed this study to proceed. This committee may ask to review information from the study as part of a monitoring process, but all information will be regarded as strictly confidential.

What if I have more questions? You are welcome to ask more about the study and what is involved either after reading this, or at other times by contacting me at the above telephone number or address.

As final reassurance, your participation in the study is voluntary, all information will be confidential, and you may decide not to take part, or to withdraw at any time without explanation. Whatever you decide, any treatment, services or relationships with health professionals will not be affected.

Diane S. Forrest,
Clinical Psychologist in training with Dr. Maurice Winton,
Clinical Psychology Department,
Murray Royal Hospital,
Perth.
01738 562260

APPENDIX 3: PATIENT'S CONSENT FORM

UNINHIBITED AND UNTRANSFORMED REFLEXES IN PEOPLE WITH ANXIETY DISORDERS

Consent Form

(The patient should complete this form himself/herself)

PLEASE CROSS OUT
AS NECESSARY

Have you read the Patient Information Sheet? YES/NO

Have you had an opportunity to ask questions
and discuss this study? YES/NO

Have you received satisfactory answers to all of
your questions? YES/NO

Have you received enough information about the
study? YES/NO

Do you understand that participation is entirely
voluntary? YES/NO

Do you understand that you are free to withdraw from the study:
• at any time?
• without having to give a reason for withdrawing?
• without this affecting your future medical care? YES/NO

Do you agree to take part in this study?

Patient's Signature..... Date

Patient's Name in block letters

Telephone number where patient can be contacted:

.....(Home) (Work)

APPENDIX 4: NOTIFICATION LETTER TO PATIENT'S
GENERAL PRACTITIONER

TAYSIDE AREA CLINICAL PSYCHOLOGY DEPARTMENT

Your Ref:

**Murray Royal Hospital
PERTH, PH2 7BH**

Our Ref: DSF/DB

**Telephone: 01738.621151
Fax: 01738.440431**

Enquiries to: Secretary-Direct Dial {01738.562383}

08 March 2002

Dr

Dear Dr

Re:

I am currently carrying out research for my doctoral dissertation, supervised by Dr Maurice Winton, Consultant Clinical Psychologist at Murray Royal Hospital.

This study is based on the work of Peter Blythe and Sally Goddard, and the Institute of Neuro-Physiological Psychology, based in Chester. Their research has established a relationship between the retention of uninhibited, primitive infantile reflexes in children and adolescents, and learning and behavioural difficulties. They have developed remedial exercises based on the findings, and also argue that uninhibited reflexes play a role in panic and anxiety disorders.

If there is an interaction between neuro-physiological factors and anxiety disorder, this could have implications for treatment. In researching the possibility of such a relationship, I am inviting patients in the Perth & Kinross area, who have been identified by clinicians already in contact with them, to participate in a study. By means of observation of non-invasive, carefully monitored and gentle movements, the presence of a range of uninhibited infantile reflexes can be identified in adults with anxiety as a main, or major feature of their mental health problem. This is to advise you that your patient,, has been approached and agreed to take part in this study.

As outlined above, their participation is of key importance to the work of increasing understanding about the nature of and predisposition to anxiety and related problems. Resultant data will be anonymous and confidential. If you have any further questions, please do not hesitate to contact the department, on 01738 621151, where you can discuss any questions, or leave a message.

Yours sincerely

Diane S Forrest

Clinical Psychologist in training with

Dr Maurice Winton, Consultant Clinical Psychologist

APPENDIX 5: BECK ANXIETY INVENTORY SCORING
SHEET



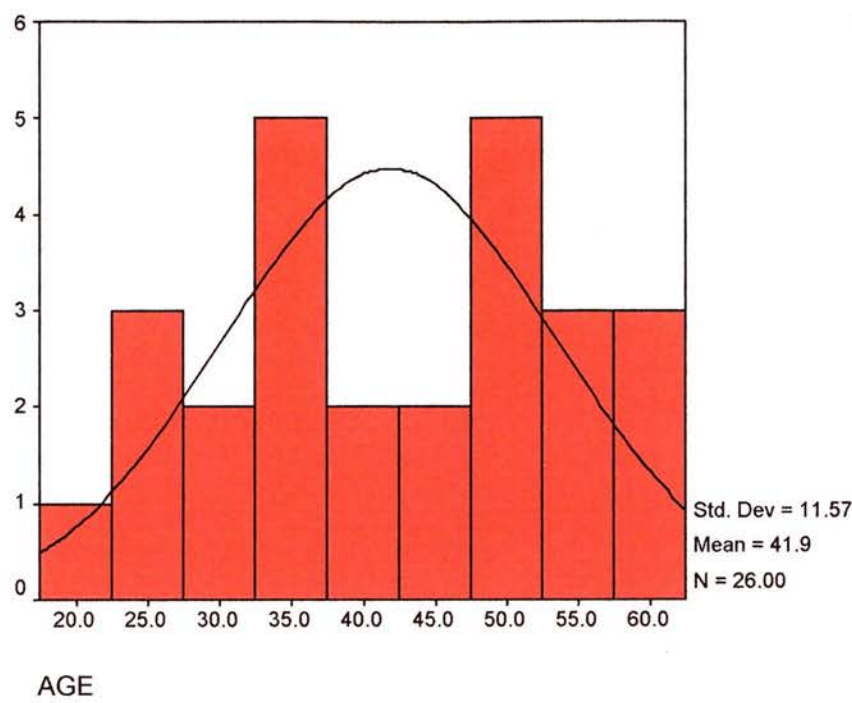
NAME _____ DATE _____

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom.

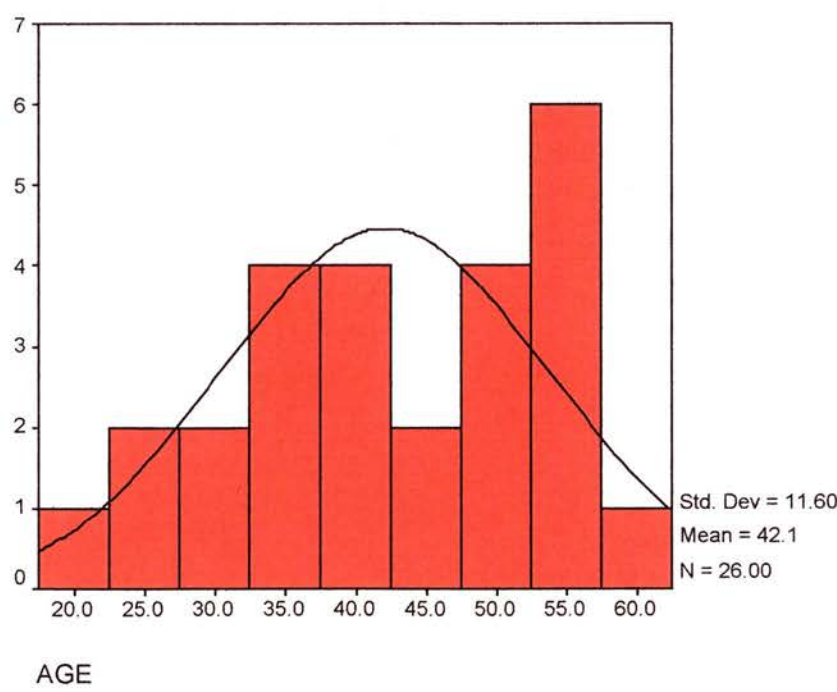
	NOT AT ALL	MILDLY It did not bother me much	MODERATELY It was very unpleasant, but I could stand it	SEVERELY I could barely stand it
1. Numbness or tingling.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2. Feeling hot.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3. Wobbliness in legs.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4. Unable to relax.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5. Fear of the worst happening.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6. Dizzy or lightheaded.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7. Heart pounding or racing.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8. Unsteady.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
9. Terrified.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
10. Nervous.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
11. Feelings of choking.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
12. Hands trembling.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
13. Shaky.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
14. Fear of losing control.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
15. Difficulty breathing.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
16. Fear of dying.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
17. Scared.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
18. Indigestion or discomfort in abdomen.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
19. Faint.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
20. Face flushed.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
21. Sweating.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

APPENDIX 6: HISTOGRAM OF AGE DISTRIBUTION:
PATIENTS AND CONTROLS

FIGURE 6 AGE DISTRIBUTIONS



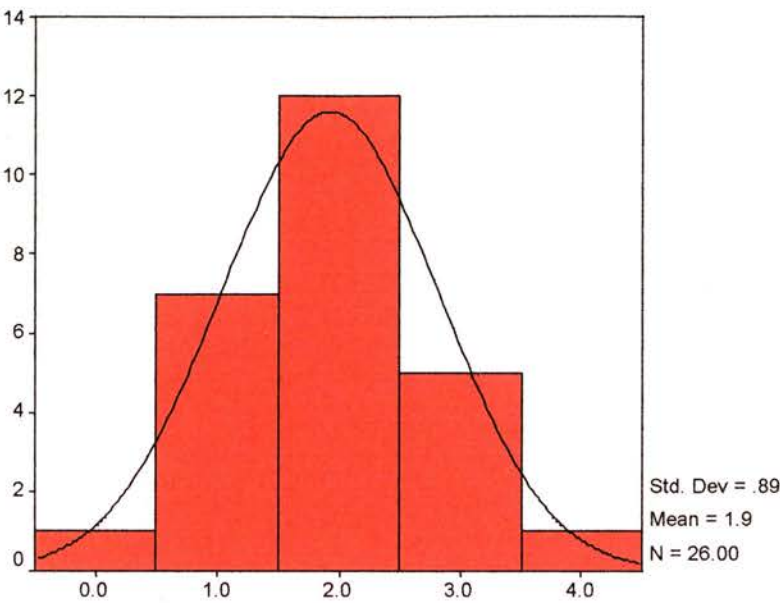
AGE DISTRIBUTION: PATIENTS



AGE DISTRIBUTION: CONTROLS

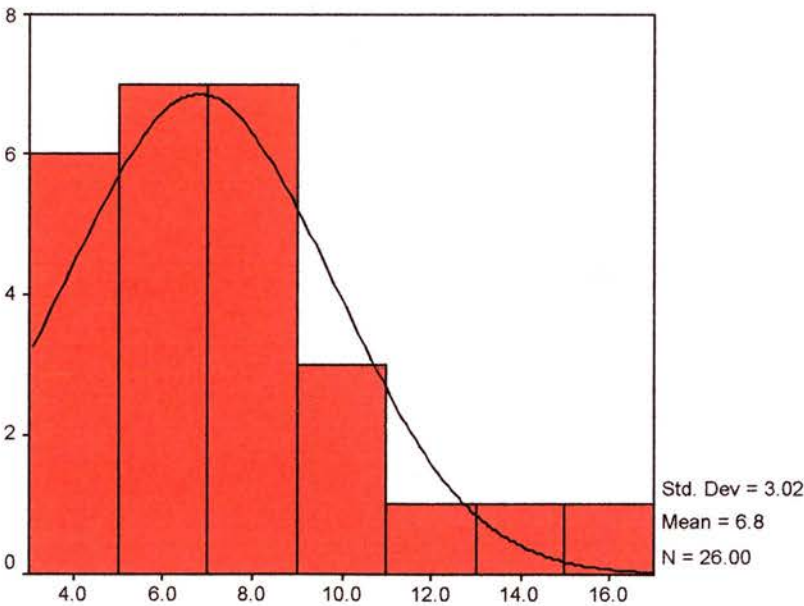
**APPENDIX 7: HISTOGRAM OF DISTRIBUTION OF
REFLEX TEST SCORES: PATIENTS AND CONTROLS**

FIGURE 7 : INPP REFLEX TEST SCORES



INPP

DISTRIBUTION INPP MEAN SCORES: CONTROLS

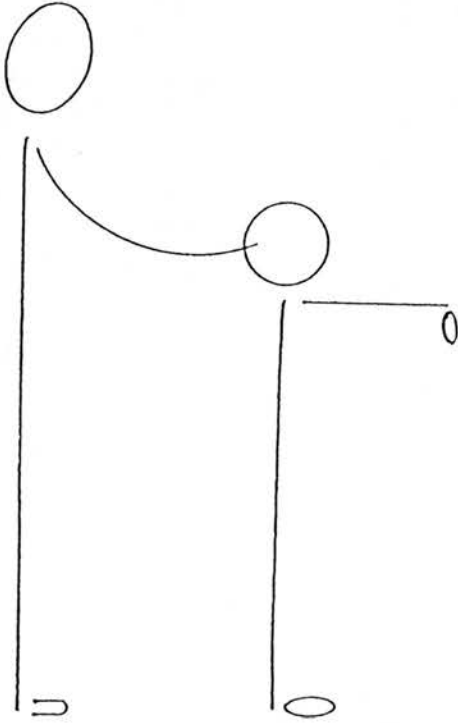


INPP

DISTRIBUTION INPP MEAN SCORES: PATIENTS

APPENDIX 8: I.N.N.P REFLEX TESTS

Asymmetrical Tonic Neck Reflex Schilder Test



Test position

Standing, feet together, with the arms held straight out at shoulder level and height, but with the hands relaxed at the wrists.

Test procedure

Tester stands behind the subject and gives the instruction: "When I turn your head, I want you to keep your arms straight out in front of you, as they are now. This means your arms remain in the same position, and only your head moves." Tester then slowly rotates the subject's head until the chin is parallel with the shoulder. Pause for 10 seconds. Return the head to the midline. Pause for 10 seconds. Rotate the head to the other side and pause for 10 seconds. Repeat the procedure up to 4 times.

Observations

Any movement of the hand and arm on the side to which the head is turned, i.e. do the arms automatically follow the movement of the head?

Scoring

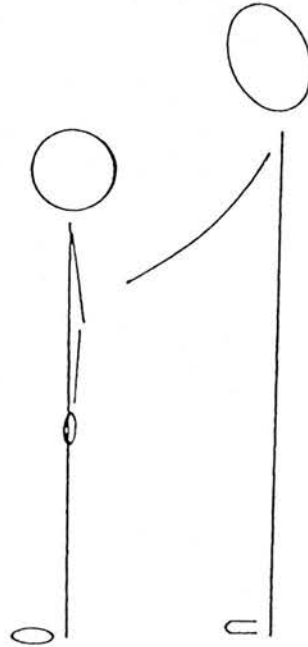
- 0 no response
- 1 slight movement of the arms in the direction the face is pointed
- 2 movement of the arms in the direction of the head to 45°
- 3 arm movement to 60°
- 4 90° rotation of the arms and/or loss of balance as a result of head rotation

Tonic Labyrinthine Reflex (Erect Test)

It should be noted that this test only represents one test in a battery of tests for the tonic labyrinthine reflex. (TLR)

Emerges: Birth

Inhibited: 2-3 months in the prone position,
2-4 months in the supine position, but may still be
present in a weakened form up to the age of 3 years



Test position

Standing with feet together, and arms straight
at the sides of the body.

Test procedure

Slowly tilt the subject's head back into extended position and ask the subject to close the eyes. (Stand behind to support in case there is any loss of balance). After 10 seconds ask the subject to slowly move the head forward as if looking at the toes, and maintain that position for a further 10 seconds. Repeat the sequence 6 times.

Observations

Note any loss of balance or alteration of balance as a result of head position, or as a result of head movement from above to below the level of the spine. Also note any compensatory change in muscle tone at the back of the knees as a result of head movement, or, gripping with the toes. Ask the subject for any reactions immediately after testing, and note any comments about dizziness or nausea, both of which suggest faulty vestibular functioning and/or the residual presence of the tonic labyrinthine reflex.

Scoring

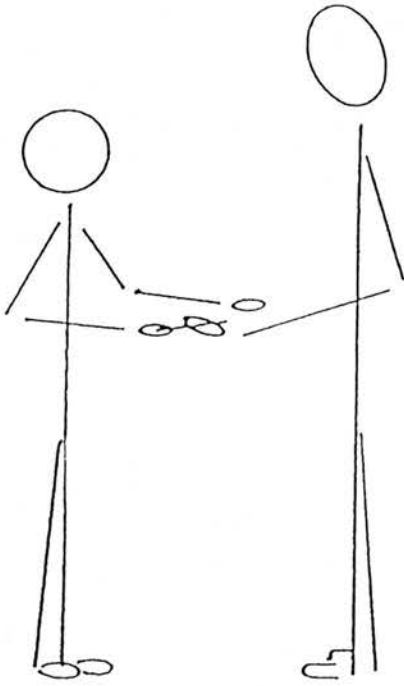
- 0 no response
- 1 slight alteration of balance as a result of head position or movement
- 2 disturbance of balance during test and/or alteration of muscle tone at the back of the knees
- 3 near loss of balance, alteration of muscle tone and/or disorientation as a result of the testing procedure
- 4 loss of balance and/or massive alteration of muscle tone in attempt to maintain balance. This may be accompanied by dizziness or nausea, and in adults, feelings of panic.

Palmar reflex

Emergence: 11 weeks in utero

Birth: present

Inhibited: 2-3 months neonate



Test position

Standing, feet together with arms bent and palms upturned in a flexed, relaxed position, elbows away from the body.

Test procedure

Gently stroke with a soft brush along the creases of the palm. Repeat twice.



Observations

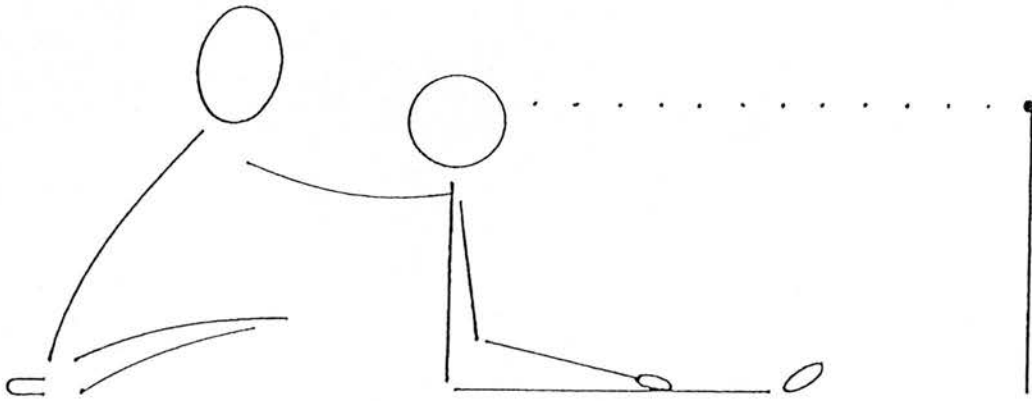
Any movement of the fingers or thumb inwards toward the stimulus, or extreme sensitivity in the palmar region.

Scoring

- 0 no response
- 1 slight movement of the fingers or thumb inward
- 2 definite movement of the thumb or fingers inward, subject complains touch is ticklish or painful
- 3 movement of the thumb and/or fingers inward as if to grasp the stimulus, rubbing of the hands immediately after testing
- 4 thumb and fingers close in on stimulation. This may be accompanied by simultaneous movements of the lips

OCULO-HEADRIGHTING REFLEX

Emergence: 2-3 months neonatal
Not inhibited.



Test Position

Subject seated on floor, legs straight in front, arms resting on thighs.

Test Procedure

1. Subject fixes eyes on an object at eye level.
2. Tester sits behind subject and slowly tilts the subject to the left in 3 stages, pausing for 2 or 3 seconds at each stage. Pauses are made at 15°, 30° and 45°. *Note the position of the subject's head at each degree of tilt.*
3. Return the subject to the upright sitting position, again in the 3 stages.
4. Repeat procedure to the right, return to the midline and then repeat the procedure backwards and forwards, ensuring that the subject keeps the eyes fixed on the object at eye level.

Observations

Head should automatically correct itself to the vertical (vertical to the ground) as the body position is altered in all four directions. Any flopping of the head or over-compensation in the opposite direction upon return to the midline position suggests an absent or under-developed oculo-headrighting reflex. Also note any extension of the leg on the side to which the subject is tilted — this may be an indication of a retained asymmetric tonic neck reflex (ATNR) in the leg.

Scoring

0. Head corrects to the vertical midline position throughout the test.
1. Head slips slightly from the vertical.
2. Head follows direction of the tilt in line with the body.
3. Head leans below the line of the body.
4. Head drops in direction of the tilt.

Lack of headrighting forwards/backwards could indicate underlying tonic labyrinthine reflex (TLR).

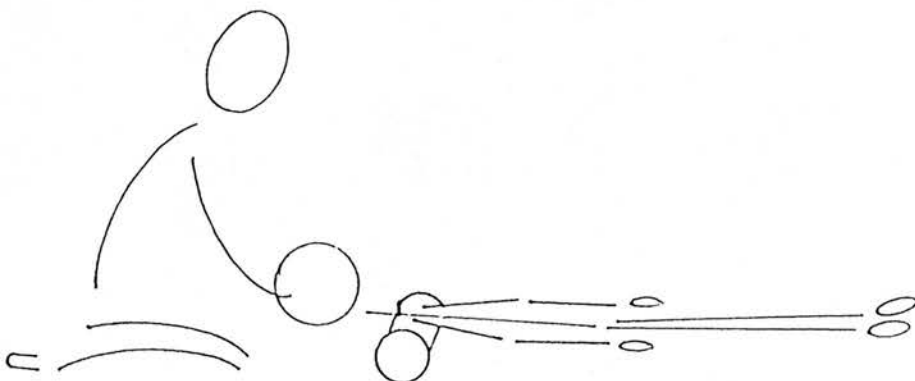
. Moro Reflex

Standard Test for Vestibular-Activated Moro

Emergence: 9-32 weeks in utero

Birth: fully present

Inhibited: 2-4 months neonate



Test position

Supine, with arms flexed and hands resting on the floor. Shoulders should be raised with a small cushion and the child's head supported in the tester's hands and elevated approximately 2 inches above the level of the spine.

Test procedure

After just a few moments the tester should allow the child's head to drop 2-3 inches to just below the level of the spine, but not to reach the floor, having first given the instruction, "When you feel your head drop you must clasp your hands together across your chest as quickly as you can."

Observations

Any movement of the arms outward away from the body. Inability to bring the arms across the chest, or delayed action. Disorientation or distress as a result of the test procedure.

Scoring

- 0 immediate hand clasp and no adverse reaction
- 1 slight delay in reaction
- 2 delayed reaction, incomplete hand/arm movement or breath holding
- 3 no arm movement, alteration in breathing, and visible dislike of testing procedure
- 4 movement of the arms outward away from the body, leg extension and/or distress

Also note any reddening of skin or pallor immediately after testing